NEWS IN PERSPECTIVE

APRIL 15, 1961

MANAGEMENT VIEW

WHAT THE COSTS WOULD HAVE BEEN without the "conspiracy" of electrical equipment manufacturers is the answer investigators for a group of 80 investor-owned electric companies are charged to find. This utility group is operating through a committee, whose chairman is George D. Gibson, general counsel for Virginia Elect. Power Co. and with the assistance of the Stone & Webster Eng. Co. The regional approach is represented by 10 New England utilities, part of the above group, but retaining their own (Boston) law firm. (Earlier, California utilities had announced plans to conduct a joint study of price effects.) How would "overcharges" affect utility operating cost?--"If there had been a markup of 5-percent," explains Pennsylvania P.&L.'s Pres. Jack K. Busby, "increased annual cost of service would be only about 0.1-percent."

A "SIMPLE LEARNING PROCESS," developed after two years of joint research by Consumers Power Co., Commonwealth Associates and the U. of Mich. in connection with power plant studies for Consumers, is called a "major breakthrough in the economic use of electronic computers." Revealed at the American Power Conference last month, the new computer technique solves various control, design and analysis problems and, used as a "detective," discovers potential weaknesses in existing electrical systems.

"MORE FAVORABLE THAN EXPECTED" is the way American Elect. Power's Philip Sporn terms results with the magnetohydrodynamics experimental project being conducted by Avco and supported by a group of a dozen electric utility companies. "Avco studies continue to affirm that the MHD power system promises considerably higher efficiencies at reasonable capital costs," Mr. Sporn said of a new MHD generator, which may be capable of producing up to 500-kw.

"TO BE AN EFFECTIVE CONSUMER of energy is far more important insofar as the creation of real wealth is concerned," said B. C. Electric Co.'s John Davis, director of research and planning. The Canadian utility official explained that "all the available evidence suggests that to be a producer of energy is, doubtless, useful, but whatever the reason--be it lower prices, an abundance of other natural resources, or a wide variety of skills--we find it is better to be a consumer than a producer." (For example, he noted that in the U. S. the state of Delaware ranks first, the state of Texas 30th on a personal income basis; in Canada, the two richest provinces, Ontario and British Columbia, come fifth and sixth insofar as their total output of energy is concerned.)

"EXCEPTIONAL RECREATIONAL BENEFITS" will be provided by 1,200-acre reservoir to be used for cooling purposes at the West Virginia site of a newly announced Virginia Elect. Power Co. steam electric power station, with a total capacity of more than one million kilowatts. The $150-million project will have this byproduct benefit, according to VEPCO Pres. A. H. McDowell: ". . . a lake that should prove to be a great summer tourist attraction in an area where winter sports are already prevalent."

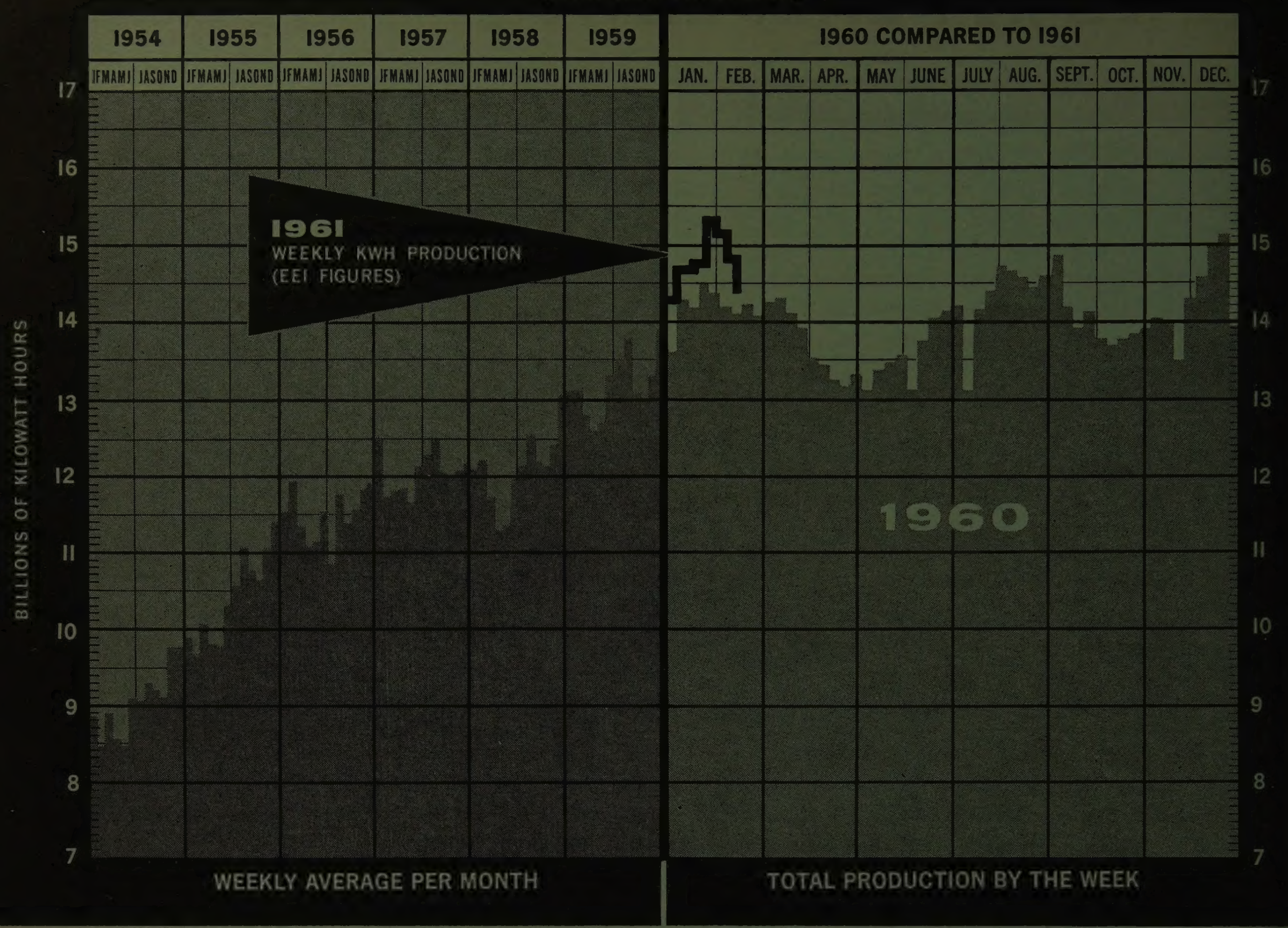
ECONOMIC CLIMATE

ECONOMIC UPTURN is about ready to make itself felt. Helped along by seasonal factors, the rise that is getting under way will become readily perceptible after mid-year. The President's chief economic adviser--who claims to take a view of "realistic optimism" for the future of the U. S. economy--expects business to improve soon. So does the Secretary of the Treasury, who notes that the Administration's budget estimates are based on a reversal in the economic trend during the current quarter.

THE BIG CHANGE probably will not come until business inventories have been brought to a low point in relation to sales. There are signs that this is happening in some basic fields.

Electric Utility Barometer

(Source: Edison Electric Institute)



NEWS IN PERSPECTIVE

The steel industry, for example, is showing only a modest tonnage rise in orders, but the number of orders is increasing. This is taken to mean that more and more consuming industries have adjusted stocks on hand to current production. Even a moderate upturn in industrial production--instead of stability at a fairly high level--should be reflected quickly in new and bigger orders.

NEW CAPITAL INVESTMENT is a weak spot in the outlook. Current business plans call for spending $34.5-billion this year for new plant and equipment. This is less than in 1960--but only by three percent. A sales pickup--expected by manufacturers, trade firms, and public utilities--could put into action a sizable number of expansion projects that have been sidelined pending resolution of the economic situation.

WASHINGTON INFLUENCE

TASK FORCE STUDY of proposed federal construction of a Pacific Northwest-Southwest intertie has been set by Secretary Udall. The feasibility of a high voltage common carrier intertie will be determined by Bonneville Administrator Charles Luce, two others from BPA, one from Reclamation, and one from Interior. The group will recommend legal safeguards so that each region will have a permanent priority on its own power. Udall said immediate action is needed because of (1) the treaty with Canada that intensifies the "need for bold plans to market the Canadian and the Northwest power;" (2) the proposed dual-purpose reactor at Hanford; and (3) the need "for maintaining the Pacific Northwest's lower power rate."

The Bonneville intertie, Udall asserted, would take care of some $30-million of wasted energy from Columbia River federal dams every year. BPA's deficit--expected to be $13-million this year--is attributed to unmarketable secondary energy. If an intertie is not built, Udall warned of pressure to raise rates in BPA's service area--"a step that seems unnecessary and one we must take every means to prevent."

ALL-FEDERAL TRANSMISSION for Trinity has been recommended by the Reclamation Bureau. Interior Secretary Udall has ordered surveys and design work but no rights-of-way will be bought until surveys are complete. Udall said the decision was "purely a matter of economics." Reclamation figured that 50 years after the San Luis unit goes into operation the Central Valley Project would produce "a surplus $12-million larger than if the government entered into an alternative wheeling contract." The surplus figure includes salvage value of "at least $10-million." Cost of 230-kv lines from Trinity plants to four California towns is put at $28.8-million, including necessary equipment. To be studied is possible construction of some line for conversion to 500-kv for use with the potential Pacific Northwest-Southwest intertie.

COLUMBIA RIVER TREATY was ratified by the Senate, 90 to 1. Sole dissenter, Bennett (R., Utah) opposed it as "a protest against the trend toward further federal subsidy of power production." Treaty proponents claim water flow made possible by Canadian dams equals a rise of 20-percent for U. S. power plants. The increase will be shared equally with Canada. Delivered cost of new power is estimated at little more than $8 a kilowatt-year--less than half of BPA's present wholesale power rate. U. S. share in the increase will be almost 1.15 million kw of prime power --equal to another Grand Coulee. Construction of Libby Dam would boost gains even higher. Cost of G&T to take advantage of new benefits will be about $150-million during this decade, with another $268-million to be spent (mainly for generation) during 1970-85. BPA's rate level probably will be stabilized "over a considerable period of time."

$45-MILLION BURNS CREEK PROJECT--recommended by Interior--came in for some harsh criticism in the Senate hearings. The U. S. Chamber of Commerce said that a few preferred customers would get subsidized electricity at the expense of all taxpayers, while at no cost to federal taxpayers a local utility is willing to supply all power needed. Clarence Miles of the Chamber pointed out that 98-percent of the cost is allocated to power. Daniel W. Cannon, speaking for the National Association of Manufacturers, urged private construction. He said the net effect in regard to electric power would be negative because of the drain on the Treasury and losses in taxes on all levels if the government constructed the project.

Secretary Udall claimed that the benefit-cost ratio is 1.65 to 1.

SEATTLE'S PROPOSED PROJECT at Boundary site on the Pend Oreille River is preferable to one proposed at Z Canyon by PUD No. 1, according to a decision of FPC Examiner Marsh. His ruling would give Seattle a 50-year license on the grounds that its project would use practically all the undeveloped hydro potential between the existing Box Canyon Dam and the Canadian border. The PUD sought a license for the Low Z Canyon Dam but planned either raising the dam or building one or two other projects. Marsh said the PUD failed to prove a market for much of the power to be produced and held the projects not financially feasible. Seattle, he ruled, had both market and money for its $97-million project, with initial installation of 540,000-kw and ultimate capacity of 810,000-kw. The decision allocated 48,000-kw of the Boundary project to the PUD. A license condition is four low-level outlets in the dam in case mineral reserves are found. The ruling is subject to full Commission review.

GENERAL REA PROGRAM, approved by Agriculture Secretary Freeman, recognizes need for G&T loans for co-ops, opposes any change in the 2% interest rate on REA loans, favors strict enforcement of the public preference clause, and says that the development of natural resources and G&T of power in Federal facilities "has had a direct and important impact on the rural electrification program, on the well-being of REA policies, as well as on sound economic development of rural areas."

LOWER FUEL COSTS is the key to making A-power competitive, JCAE has been told. Other nuclear power production costs--equipment, insurance, maintenance and operation--are likely to remain high. Use of enriched uranium in a pressurized water reactor means fuel cost of 3.38-mills per kwh. Fuel costs must be cut to 2-mills or less to be competitive. Substituting thorium for uranium was also suggested.

GRAND JURY RECORDS in the electrical equipment antitrust cases may become available to Sen. Kefauver for his subcommittee investigations. New Antitrust Chief Loevinger said that the Justice Department's policy has not been settled and he could not turn over testimony. However, the Department had no objection to the Subcommittee's filing a motion for disclosure with Judge Ganey. Justice could then take Ganey's position under advisement.

IDENTICAL BIDS to the government for all items will be reported to the Attorney General. An Executive Order will make them public.

INDUSTRY SIFTINGS

SUITS AGAINST CONSPIRACIES--Manufacturers supplying utilities were on the receiving end in one instance last month, but in another case one brought legal action against utility companies (and other manufacturers). The U. S. (Justice Dept. and TVA) filed a joint civil suit against five electrical firms supplying oil circuit breakers, alleging that prices since 1951 were 40-percent higher than should have been charged and asking over $12-million in damages incurred. But in Illinois, a manufacturer of gas burners filed a $24-million damage suit against the People Gas Light & Coke Co. and 13 other firms, charging that they conspired to restrain trade in the manufacture, sale, use and installation of gas burners.

COLORFUL ANNUAL REPORTS--This year the electric company versions used more good color photography than ever before . . . and the results were highly impressive. (One report with a particularly attractive personality is Northern State Power Co.'s.) Growing practice: providing comparative data spanning past years, for say a ten-year period--of particular value to security analysts.

BY PLANNING IMPROVED METHODS continually, your customers can (and must) secure increase in productivity year after year, George Jernstedt, mgr. of mfg. planning for Westinghouse, advised conferees at the EEI annual sales conference last month. "Be sure you are helping your customers in looking at new methods," he urged. How?--Taking customers to visit other related manufacturing organizations; upgrading his performance (and your own knowledge) by making contact with local technical societies in your customer's individual field of effort.

INTEGRATED NUCLEAR SERVICE, called the first in the U. S., was formed last month by Olin Mathieson Chemical Corp., Nuclear Develop. Corp. of America and Mallinckrodt Chemical Works. The new company, United Nuclear Co., will have "skills and facilities" for R&D, reactor design, fuel manufacture and management, reactor and core fabrications, scrap processing, isotopes and radiation energy sources.

KING-SIZE GENERATION ABROAD: In the U. K. the world's largest capacity station (2000-megawatts) with four 500-megawatt English Elect. Co. units will be operating in 1965; in Japan, a $20-million, 325-megawatt steam-electric plant will use a Westinghouse generator --largest ever made in the U. S. for export.

MORE CREDIT UNIONS--In the U. S. in 1960, there were 443 serving employees of utilities--10 more than in the year before. In Canada, one new one brought the total to 24.

FARM ELECTRIC SALES HANDBOOK, in a newly revised and expanded edition is now available from EEI. (Text only price to Institute members is $2.25, to non-members, $2.75.)

ANOTHER FIRST FROM HOLAN...

So New We Haven't Dressed it Yet

It's ready now — the first center-mounted derrick for the utility field that can be operated from a rotating crow's-nest. All that's left to be done is to sheathe in a famous Holan-built body.

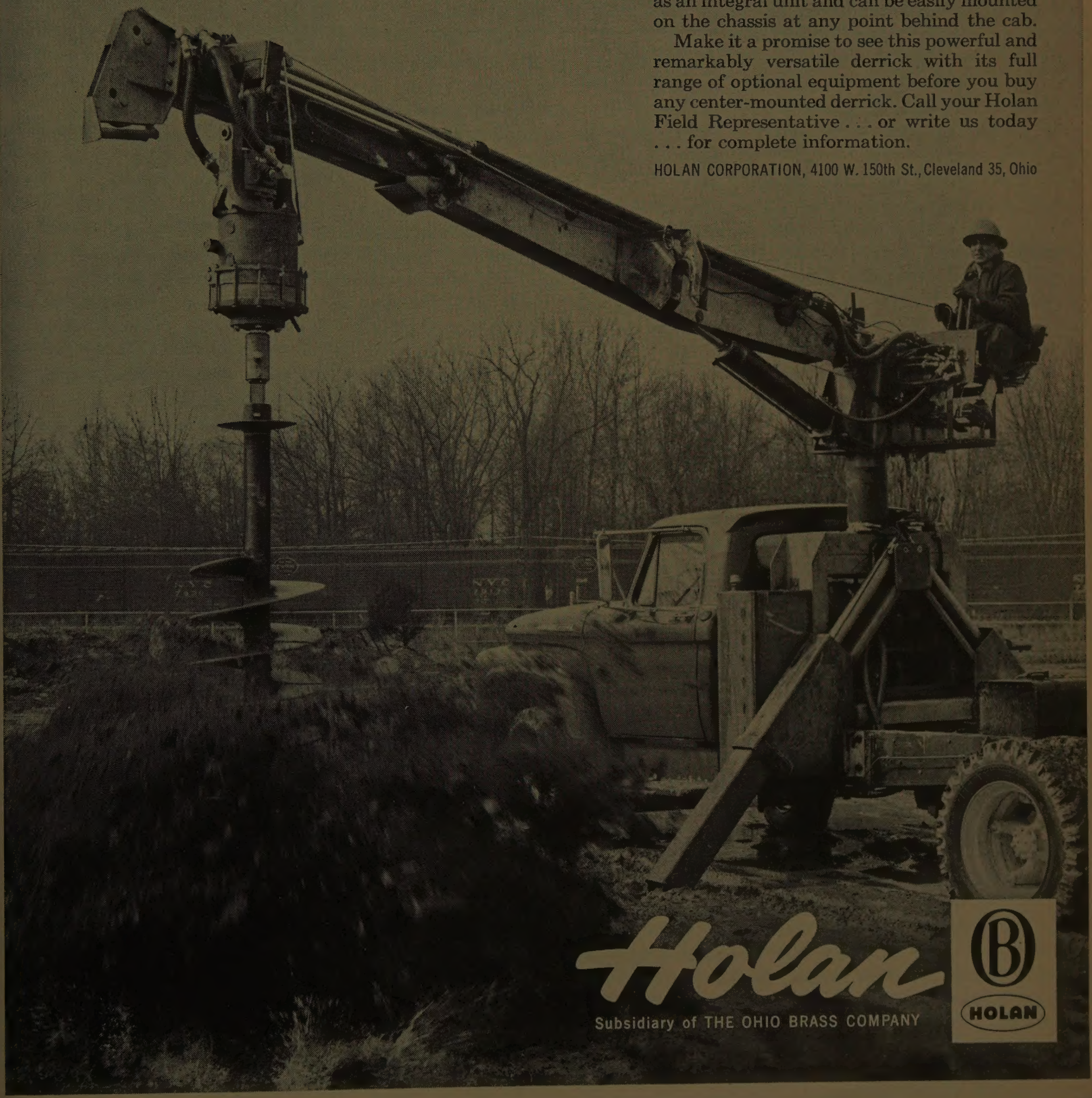
But it has already been subjected to hour after hour of torturous digging and lifting in every position. And it can take it . . . take even the punishment of harnessing the 8,400 pounds of torque of the Holan 5400 Earth Borer.

The center-mounted 7700 erases the blind spots, permits the operator to dig and "live boom" 9,000 pounds . . . rotate 360° in either direction . . . extend and retract the 7-foot boom . . . set 80-foot poles. And he does it all with foot and hand controls . . . and with a safe, unobstructed view of his work area.

The derrick — including the base, superstructure and hydraulic outriggers — is built as an integral unit and can be easily mounted on the chassis at any point behind the cab.

Make it a promise to see this powerful and remarkably versatile derrick with its full range of optional equipment before you buy any center-mounted derrick. Call your Holan Field Representative . . . or write us today . . . for complete information.

HOLAN CORPORATION, 4100 W. 150th St., Cleveland 35, Ohio



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MANAGEMENT-MARKETING

Utilities Get Play-Back:

What's Our 'Image'? How Do You Know Us?

Most users of electricity are satisfied with what they get in product and service . . . but many customers know little about the organization serving them—whether their utility is one of the biggest investor-owned corporations in a metropolis like New York City, or a small co-op in rural Indiana. Newly gathered public opinion data proves this, once again.

In New York, as Con Edison found in a recent public attitude study conducted for it by Opinion Research Corp., eight out of 10 people have a generally favorable attitude toward their utility company . . . but that many of the attributes regarded by Con Edison as important in its public image are getting rather meager recognition from the public.

In Indiana, Central Surveys, Inc., discloses that its post-election survey of 700 REMC co-op members shows that, while most are well satisfied with their present arrangement for electric service, most do not know where power supplies initiate, and they are generally unfamiliar with their national organization (NRECA).

Five investor-owned electric utilities sponsored the opinion study conducted by Control Surveys, Inc.

The survey in Indiana was aimed primarily at determining the extent to which rural electrification was an issue in the November 8, 1960, election. It was a very minor one—one percent of the persons interviewed volunteered that this issue was a very important one to them personally . . . and very few say it influenced their vote on either the congressional or gubernatorial contests.

Opinions about their co-op organizations were more revealing, in that the survey disclosed that, on several points of information, a majority of these co-op members either have no opinion or have incorrect information. Here is the way Central Surveys summarizes the highlights of these findings (percentage figures in parenthesis are interpolated from the report data):

they wield an important brush!

"On several points of information, however, a majority of REMC co-op members either have no opinion or incorrect information. For example, a majority do not realize that the REMC co-ops receive their wholesale power supplies from the investor-owned power companies (64%), nor that the REMC co-ops are taxed on a different basis than the investor-owned power companies (76%), nor that the REMC co-ops are able to borrow from the Federal Government at a 2-percent interest rate (76%).

"When asked to express an opinion on these points, however, a majority of REMC co-op members reply that their REMC co-ops should pay the same taxes as the investor-owned companies (64%) and should also pay an interest rate corresponding to the actual cost of money to the Federal Government (63%).

"REMC co-op members also indicate a general lack of familiarity with their national organization (National Rural Electric Co-operative Association, or NRECA) (71%), with its General Manager, Clyde Ellis (87%), and with the association's stand on the question of government ownership of electric power (98%). Majorities are also uncertain whether the local REMC co-ops, and the state association, support or oppose government ownership of electric power (65% in the case of local REMC co-ops, 73% in the case of the state association). However, it is the opinion of a majority of members that the rural electric co-ops should not promote government ownership of power (58%, with 31% more having no opinion).

Con Edison, after conducting public attitude surveys in 1950, 1953 and 1955, decided in 1960 to employ Opinion Research Corp., "because of their comprehensive development and refinement of 'corporate image' analysis . . . (which) adds a valuable new dimension to our continuing measurement of public attitude trends."

In sum, here's the "image" of Con Edison:

Compared with certain other leading New York services, banks, manufacturing and retail establishments, Con Edison ranks at the top in "general favorability."

More than half the public thinks the company is efficient and well managed, provides excellent service (and good emergency service), with courteous, friendly, and well-trained employes. Half said the company "makes it convenient to pay bills."

In some other areas, however, results of the study suggest that Con Edison needs greater recognition. For example, only three to four people out of ten see the company as trying to keep rates reasonable; or as being research minded; or progressive and future minded.

Only two out of ten see the company as being a leader in atomic energy; as getting along with labor unions; as taking an interest in community affairs; or as having management people who are active in community affairs.

ECONOMIC OUTLOOK *BY A. C. FARMER ECONOMIC CONSULTANT*

The Tides of Money in 1961

In the constitution of the United States of America, uthorization for the creation of money is placed in he hands of the Congress. The authorization is contained in the following statement in Section 8.

"The Congress shall have power . . . . to coin money, regulate the value thereof, and of foreign coin . . .".

This authority has been delegated by Congress to the following:

A. The Federal Reserve Bank, which exercises its control through the purchase or sale of government securities, the purchase or sale of gold certificates, the regulation of member bank reserves, and the interest charged on loans to member banks.

B. The Treasury of the United States, which exercises its control through the issuance of gold and silver certificates and coins — and in emergency through deficit financing — the sale of government securities directly to the banks.

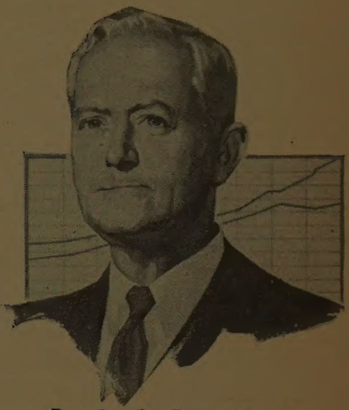
C. The Commercial and Savings Banks, which expand or contract the volume of money through changes in their loan and investment account.

D. The Government Agencies authorized to borrow money and to approve loans for their specific activity.

The present monetary system of the United States began with the passage of the Federal Reserve Act, December 13, 1913, basically designed as an Act to "furnish an elastic currency" (Preamble). An "elastic currency" necessarily makes possible unlimited expansion of the volume of money. Senator Elihu Root said at the time, "If we enter upon this career of inflation we shall do it in the face of clearly discernible danger."

The danger referred to by Senator Elihu Root first was experienced in the business depression after 1929. The same danger again will reach a critical stage after 1964, and therefore it is desirable to review each year the changes in the total volume of money in the economy, which makes it possible to recognize developments that could be critical. Without proper controls the tides of money, advancing and receding, can prove an irresistible and devastating force.

Changes in the volume of money in the post-war period have resulted practically entirely from the expansion of bank loans. Bank loans have expanded by $109.9-billion since 1946, while the expansion of money from the direct operation of the Federal Reserve Bank and the Treasury shows an increase of only $4.6-billion. In the period under consideration, deficit financing was sparingly employed, as can be noted from the fact that the investments of the Commercial and Savings Banks actually show a decrease of $2.0-billion.



By A. C. FARMER

Whenever the expansion of bank loans at the Commercial Bank slows up, so also does the rate of business activity. This also is true of the related demand deposits.

The following figures are significant:

	Bank Loans at Commercial Banks	Demand Deposits Dollars - Billions	Time Deposits
1958	98.2	115.5	98.3
1959	110.8	115.4	101.8
Change	+12.6	—0.1	+3.5
1959	110.8	115.4	101.8
1960	118.1	114.5	108.1
Change	+ 7.4	—0.9	+6.3

Bank loans expanded less in 1960 than in 1959, with practically no change in demand deposits and with expanding time deposits.

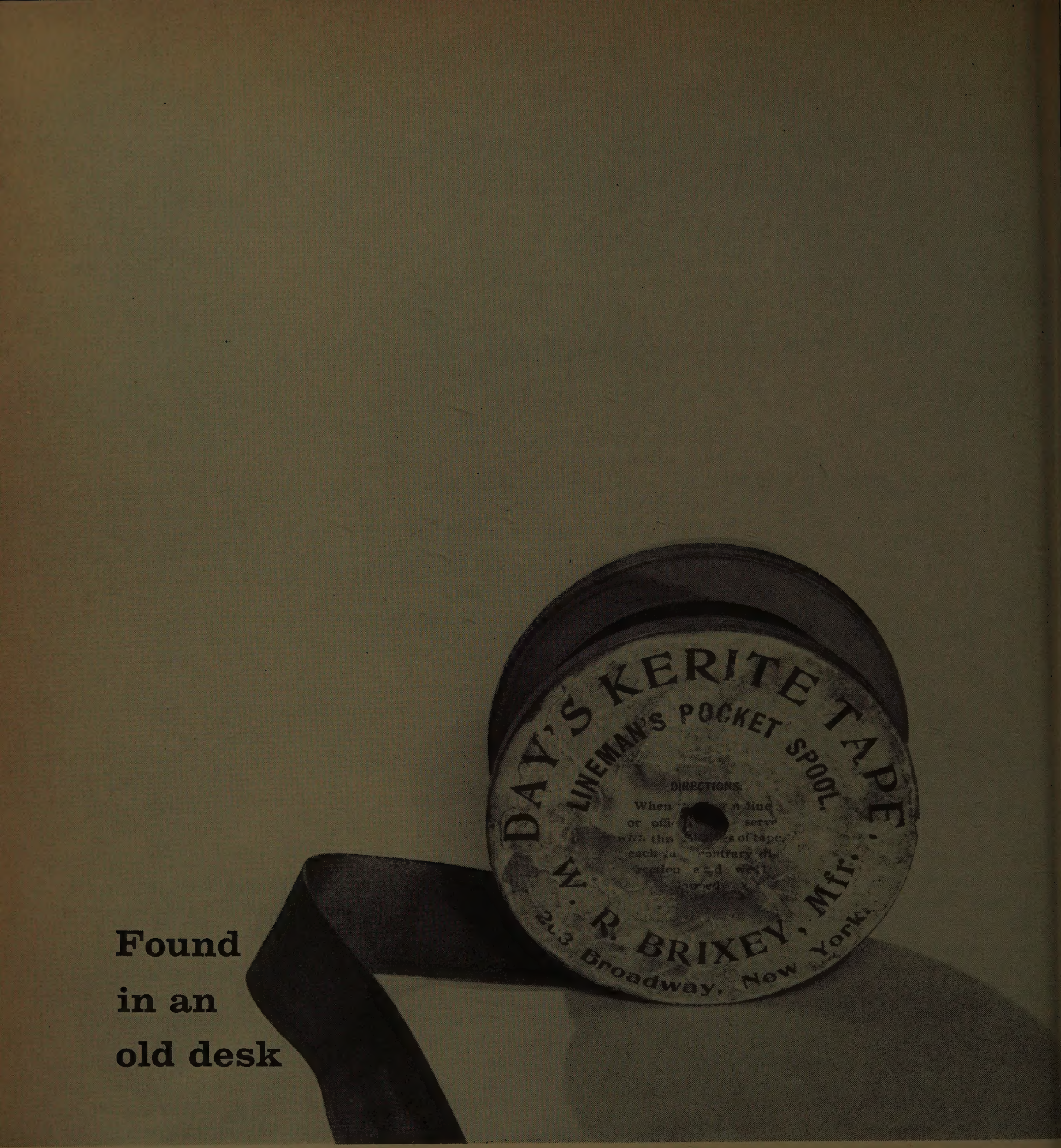
This type of monetary development always is associated with a declining rate of business activity such as occurred during 1960.

For an expanding rate of business activity in 1961, an essential will be an expansion of bank loans by the commercial banks. The quickest stimulant to business activity would be a reduction in the Federal Reserve discount rate — say from 3-percent to 2-percent.

Other methods to expand the volume of money (purchasing power) in the economy would prove helpful — for example, to provide money for government spending through deficit financing — but these methods are slow and cumbersome; that is, they do not assure quick results.

It can be predicted that this fact will be recognized by the Washington Administration and business activity will improve through 1961 and later years as the tides of money flow faster from expanding loans stimulated by lower interest rates.

History shows that lower interest rates provide the only effective method for dealing with the problem of unemployment that recently has grown to such serious proportions. Under this program, four years of improved business activity lie ahead.



Found in an old desk

When this spool of tape was new, the twentieth century had not yet been born. Salty old Captain Brixey owned the Kerite business and was making cable history.

His Kerite wire had been used for a 300-mile railway block-signal system . . . the longest aerial cable of its time. A Kerite 1,000,000 circular mil power cable laid in the Gowanus canal was already ten years old in 1908 and "just as good today as it ever was and giving the best possible service."

One of the Captain's most colorful projects was the Kerite cable laid along the Panama Canal, the first telegraph connection between North and South America. The joints were made with Kerite splicing compound (Kerite insulation in tape form). These joints were not only dielectrically sound but had to match the cable insulation in terms of insulation resistance and capacity in every way. Thirty miles of this cable were submerged, but in jungle and water, cable and tape stayed in service for over forty years.

A lot of time has gone by since this spool was young.

Yet this old tape is apparently as flexible and strong as on the day it was made.

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WASHINGTON OUTLOOK

BY RALPH ELLIOTT
WASHINGTON EDITOR

The Budding New Frontier

President Kennedy had been in office less than two months at this writing. But in that short time there had been enough executive action, and enough information dropped around Washington by White House intimates, to form a fairly clear picture of the course the new President is charting, and how he is likely to stack up as a helmsman.

Although this early picture may not be accurately foretelling in all respects, basically it is reliable enough to serve as a means of bringing many day-to-day developments into perspective. No doubt the administration will from time to time be tacking in this direction and that, to take advantage of the way the political winds blow. It will be well not to let such directional deviations obscure the longer range compass setting, which points toward bigger government spending, inflation, and more political tinkering in the country's economic and social affairs.

John F. Kennedy is as politically-minded as they come. He puts great store by the theory that political know-how and political success are prerequisite to effective statesmanship. As a politician he is astute, competent, unusually calm in the clutch. His almost boyish charm and outward easy-goingness belie a penetrating perception and a readiness to go to the whip, if need be, to gain vital ground.

He works like a Trojan, makes decisions quickly and clearly, surprises people with his knowledge of the details of government affairs, hates red tape, and frequently startles officialdom with short cuts.

His primary goal, reduced to simplest terms: to bring about the greatest good for the greatest numbers. He has made it plain he intends to use the vast political powers of his office unsparingly toward that end. And he doesn't give a whoop if it earns him the title of "do-gooder."

A noteworthy facet of the Kennedy political personality was emphasized in his early insistence on going to the mat in a test of power over his proposal to pack the strategically important House Rules Committee. He refused to delay the contest (which he won by a tissue-thin margin) even though his chieftains in Congress could not give him pre-showdown assurance of enough votes to carry the proposal.

Kennedy can play it cute, too. He has consistently exaggerated the seriousness of a recession which most economists agree is not only mild, but about on its last legs. The White House play for a crisis atmosphere is aimed at prodding Congress into crash action on Administration bills, thus setting the stage for Kennedy bows when business begins picking up along about May or June.

Beyond this political play, however, the Kennedy reasoning appears to be that the expected business upturn will be too gradual, too slow in getting up steam. He doesn't want to wait to see what happens; he wants to do something about it now — give the economy a shot in the arm, hurry things up. The main reason, and a matter of grave concern to Kennedy, is that unemployment somehow is much higher than it should be, in light of the mildness of the recession. And joblessness is poison, politically, as well as a hardship economically. The labor unions, on whose support he puts a high value, are showing impatience and are even beginning to say some nasty things about the pace of the Kennedy make-work program.

Contrary to some beliefs, the President wants to promote a favorable climate for business. He views his recession programs as wholly compatible with that desire. In other words, good business generates prosperity, cuts unemployment; he's all for it. But, he thinks, when business sags the government must step in, quickly, boldly, and play as strong a role as necessary to avert depression — call it "controlled economy," "regulated economy" or what have you. The extent to which he may be inclined to overdo the government intervention bit, or to play politics with government spending programs, remains to be seen.

Up to now, the general feeling among business people toward Kennedy appears to be considerably warmer, and more patient, than expected. His conduct so far has earned him that feeling.

But in some areas of the business community he has struck a sour note, and has created much skepticism, if not outright hostility. Most glaring example of this is in the investor-owned electric utility industry. Kennedy's proclaimed resource development and power policies, and the pattern of his appointments to jobs of control in the government power field, echo a strong public power influence and clearly spell accelerated encroachment by socialized power in a substantial segment of the industry. Kennedy is sold on the political potency of programs to bring "cheap government power" to the people. The pace at which his subordinates are moving to put the government deeper into the electric power business in competition with private industry, stands out as significantly contrary to Administration assurances of a desire to encourage industry expansion.

The President's personal popularity throughout the country is reported as amazingly high. Yet, broadscale support of his programs is not yet evident. Something that *is* evident is that the Kennedy charm has failed to penetrate Congress. Present Capitol Hill atmosphere indicates that although much of the Administration's anti-recession program will be enacted, the timing will be far from the way Kennedy wants it. Hence, the President's plan to take his case to the country via fireside chats in the hope of building some grass roots fires under Congress.

So, what develops in the next few weeks will bear the closest watching by those affected by the Kennedy programs.

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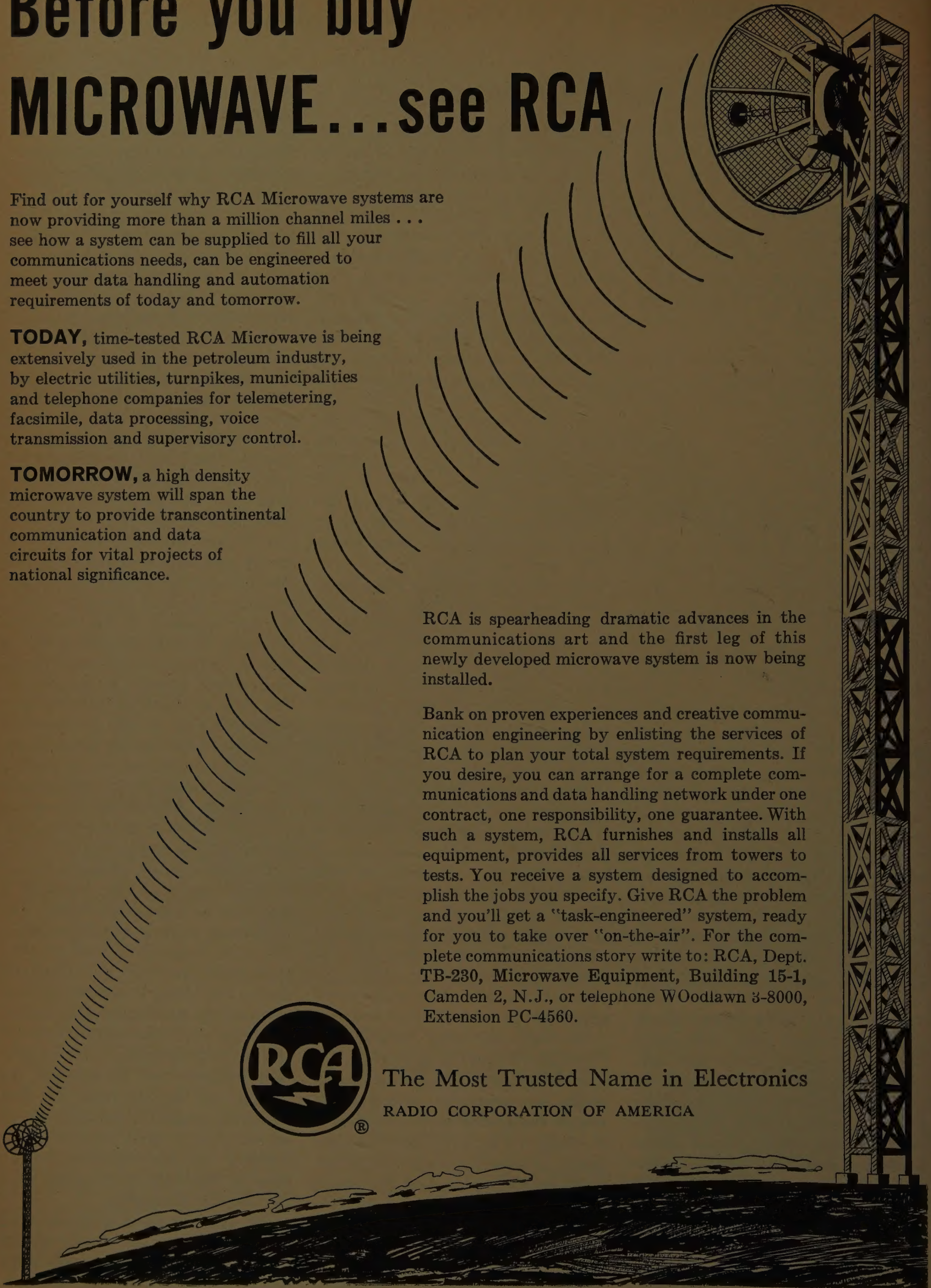

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TOMORROW, a high density microwave system will span the country to provide transcontinental communication and data circuits for vital projects of national significance.

RCA is spearheading dramatic advances in the communications art and the first leg of this newly developed microwave system is now being installed.

Bank on proven experiences and creative communication engineering by enlisting the services of RCA to plan your total system requirements. If you desire, you can arrange for a complete communications and data handling network under one contract, one responsibility, one guarantee. With such a system, RCA furnishes and installs all equipment, provides all services from towers to tests. You receive a system designed to accomplish the jobs you specify. Give RCA the problem and you'll get a "task-engineered" system, ready for you to take over "on-the-air". For the complete communications story write to: RCA, Dept. TB-230, Microwave Equipment, Building 15-1, Camden 2, N.J., or telephone WOodlawn 3-8000, Extension PC-4560.

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ENGINEERING-OPERATIONS

Progress Report on Eddystone Station

Unit No. 1 at Philadelphia Electric's Eddystone station has been operating at 5000 lb steam pressure and 1150F temperature. If current inspection shows a green light, the unit's temperature will be nudged up to 1200F, reported Robert F. Gilkeson, P.E.'s manager of engineering and research to the recent meeting of Pennsylvania Electric Association's System Planning Committee. Up to December 1960, the unit had been 96 percent available, operated at 88 percent load factor and had a net unit heat rate of 8313 Btu/kwh. Its turbine heat rate at 334 mw was 7126 Btu/kwh.

Unit No. 2, operating at 3500 psi and 1050F with 70 percent availability had a net unit heat rate of 8695 Btu/kwh. Its turbine heat rate at 334 mw was 7373 Btu/kwh.

Resonance in the steam piping system presented a movement problem. The exciting force was eliminated however, by a strategically placed T connection.

Indiana & Michigan Electric Extends Microwave Arm

Microwave equipment for a seven-station system linking Indiana & Michigan Electric's Breed plant with other company facilities will be installed in the near future. The 2000-mc RCA system will cover approximately 200 miles, connecting at Marion, Ind., with an existing nine-station RCA system that provides communications to Fort Wayne and South Bend.

The new microwave link will carry six channels of RCA multiplex equipment, providing circuits for telemetering, telephone and VHF radio control. It eventually will connect with the extensive system operated by American Electric Power. The AEP system includes 45 stations.

UE "Ices Up"

Difficulty with ice-jammed switches led Union Electric engineers to come up with a silicone compound coating applied to switch contact, bearings and pins. Silicone reduces the formation of ice and the tenacity with which the ice adheres to the metal parts of the switches.

To test the compound's effectiveness, the company rented space in a St. Louis cold storage plant and set up identical switch installations. After the equipment was held at 25F in cold storage, the switches were sprayed with a fine freezing mist produced by a fog machine used normally to put a hard coating on bacon and ham. The mist formed a clear, hard coating of glaze up to five-eighths of an inch thick.

In the experiments, one switch installation was coated with silicone, the other left uncoated. The tests continued for two weeks and proved that the silicone coating did its intended job.

Stryker's Creek Automation Pays Off

Automatic response to rapid load swings highlights the performance of boiler control systems installed at Stryker's Creek station of Texas Power & Light. The station utilizes outdoor construction. Consequently, most of the control systems, by Hagan Chemicals & Controls, Inc., are fully exposed to temperature and moisture changes. This exposure has not affected the performance of the systems, as demonstrated by their fast, accurate response to load swings on full automatic.

The boiler, arranged for natural gas firing, with oil as a standby, is a 1,200,000 lb/hr Babcock and Wilcox unit operating 1875 psi, 1005F superheat.

Stryker's Creek station operates on automatic load control, meeting the many load swings caused by varying demand. The station experienced an unexpected generator trip-out, during which the three-element feedwater control system was left on automatic. Inspection of charts after the difficulty was overcome showed that the feedwater system had maintained proper drum level throughout the two-hour shutdown, even though the system went through the complete shutdown, re-start cycle.

Three-element feedwater control was left on automatic during a generator trip-out. Inspection of charts afterward showed that the system had maintained proper drum level during the two-hour outage, going through the complete shutdown, start-up cycle.

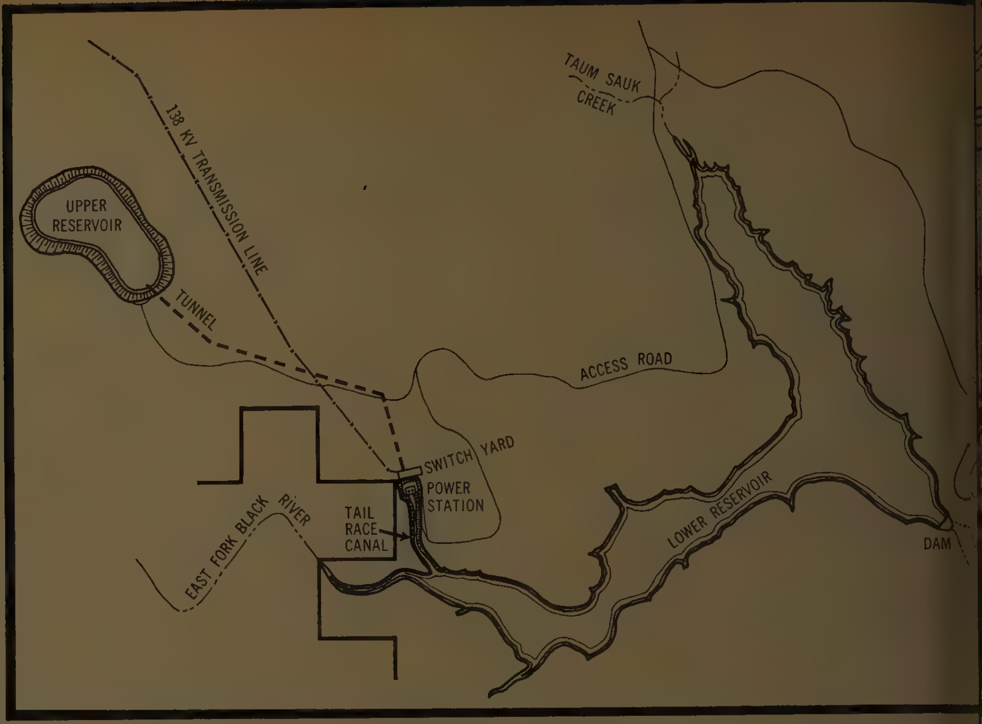


Fig. 1—General plan of the Taum Sauk pumped hydro storage plant showing relationship of upper and lower reservoirs, tunnel to power station, and connecting 138-kv transmission line.

Considerations in Applying Hydro Pumped Storage to An Interconnected System . . .

The TAUM SAUK DEVELOPMENT—Part I

A favorable site with adequate head to provide peaking capability needed is a requisite for pumped storage; energy penalties must be offset by lower capital charges to make it economically attractive.

By GEORGE S. WHITLOW,
Planning Engineer, Union Electric Company

ELECTRIC systems, growing at a remarkable and consistent rate, have been pressed with the increasing need to install larger generating units more frequently. In recent years there has been a strong need to run large units, only a few years old, either lightly loaded or completely unloaded during off-peak hours. In the future it is expected that load growth will force more of this efficient capacity into disuse during load valleys. To utilize this idle capacity an economically-feasible a-c storage battery of enormous size is needed to store energy during off-peak hours and provide power during peak load periods. A pumped-storage hydro plant can be such a facility provided that a suitable site can be found and the plant can be built at low enough cost to offset the energy penalty assessed against it because of its inability to produce energy.

Union Electric presently has such a project under construction in Reynolds County, 90 miles southwest of St. Louis. It will consist of a man-made upper reservoir on a mountain about five miles from Taum Sauk, the highest point in Missouri, and a lower reservoir formed by erecting a concrete dam across the east fork of the Black River just below the confluence with Taum Sauk Creek. The upper reservoir will be 800 feet above the lower reservoir and will cover an area of about 54 acres with a maximum depth of 110 feet. The 60-foot high dam will impound about 6000 acre-feet of water while flooding the lower reservoir surface area of only 370 acres. There will be no diversion of natural stream flow except to make up for evaporation and seepage losses. (See Figs. 1 and 2.)

The power station (Fig. 3) will have a rated capacity of 350 mw with two reversible pump-turbines directly connected to two generator-motors. These will operate at 200 rpm when synchronized with the system, and each will be capable of delivering about 190 mw at best efficiency and about 225 mw with full gate opening at minimum head. Power demand of each pump will vary from 225,000 to 266,000 hp depending on head against which pumps will be operating.

Justification of Taum Sauk

In reaching the decision to proceed with the installation of the Taum Sauk pumped hydro plant, many considerations had to be resolved. Since it is to be a peaking

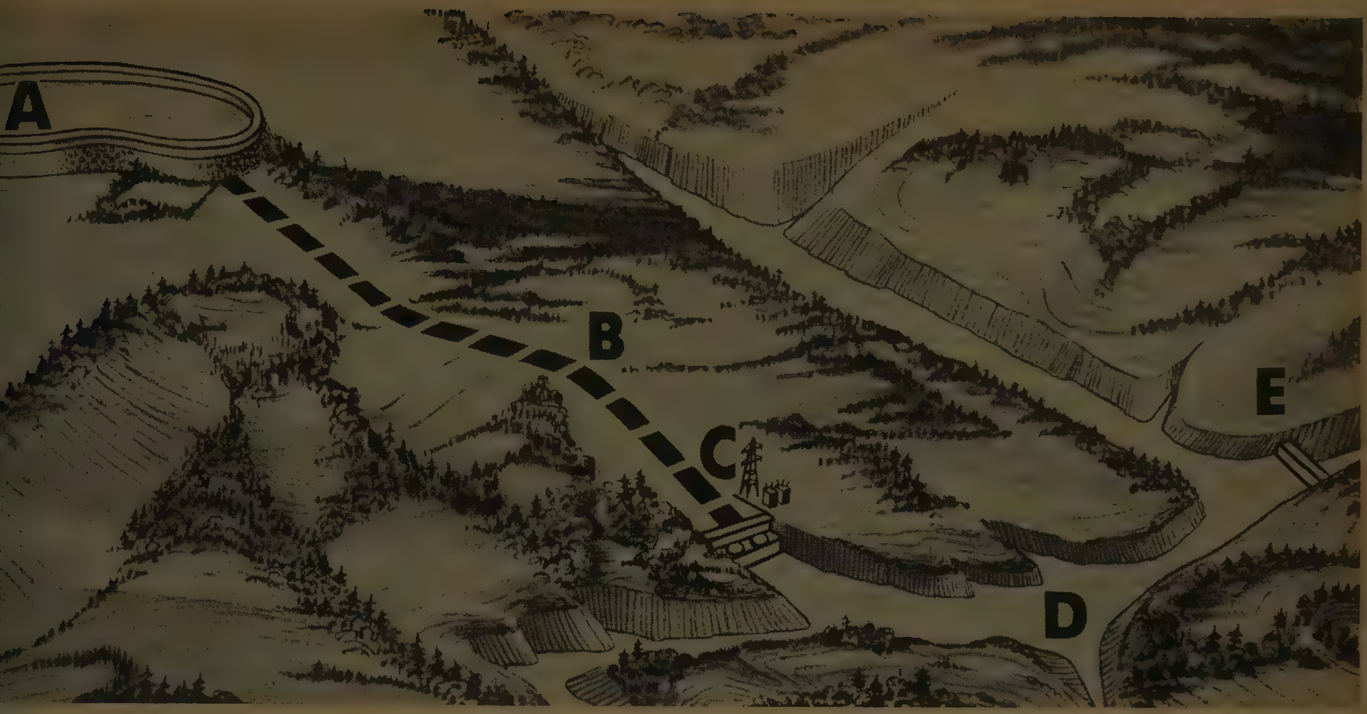


Fig. 2—Artist's conception of the Taum Sauk installation looking East; A is the upper reservoir, B the tunnel, C the power station, D the lower reservoir, and E the dam.

plant, it had to compete in cost with other types of peaking capacity as well as with conventional units. In determining the feasibility of the pumped hydro installation the following major factors, and many others, were considered:

1. Plant site . . . physical and geological requirements and location with respect to load and pumping power.
2. Transmission . . . requirements for delivery of power to load, delivery of pumping power, reasonable losses and system stability.
3. Cost of construction . . . compared to other types of plants.
4. Operation . . . its place or zone in system load pattern.

Choice of Site

The search for a suitable site was focused on finding one which would provide a relatively high head, that is, one with upper and lower reservoirs widely separated vertically. This would require less water for a given amount of energy and allow a reduction in size and cost of major components including both reservoirs, connecting conduit between them, and rotating machinery to provide a given plant capability. However, along with maximum vertical separation minimum lateral separation was also sought so that length and costs of the connecting tunnel would not become prohibitive.

Careful investigation was also necessary to insure leak-proof construction. Faulted areas, typical of some parts of Missouri, had to be ruled against because it would be too costly to make reservoirs and connecting tunnels reasonably water-tight.

Relative proximity of the plant to the service area was also a consideration in the choice of site. Fixed charges incurred in providing transmission facilities to this plant and costs incurred by transmission losses resulting from transmitting power both ways imposed restrictions on the allowable distance between site and service area. Of course, in some instances, one consideration may be used to offset another. For example, increased transmission distance with its associated costs could be offset by a site providing a higher head.

A prime consideration in selecting the Taum Sauk site was site capability. It had to match expected expansion needs at the time of installation. Too large an installation would incur excessive carrying charges until the next scheduled capacity addition could be reduced to adjust for this oversize. An installation too small would not provide sufficient capacity for needs. Extremely large variations from capability dictated by expansion needs could further upset the order of scheduling capacity additions. This is particularly true where an orderly schedule provides for a minimization of capacity, and thus fixed charges, required to meet future demand and reserve needs.

Desired capability also dictated limits in reservoir sizes. The upper reservoir must provide sufficient storage to underwrite desired capability for worst conditions. This is primarily a function of the shape of the daily load curve, as explained later. The lower reservoir must be able to match storage requirements of the upper reservoir and provide enough make-up ability to compensate for evaporation and seepage.

Transmission Requirements

From the transmission viewpoint (see Fig. 4), Taum Sauk pumped hydro storage plant will be both a load and a source of power. Consequently, its transmission requirements dictated different considerations than would have been dictated by the addition of a conventional prime energy source. Energy from the plant will be delivered to one location while its pumping energy will most likely originate at an entirely different point on the system. It was necessary to consider carefully both of these requirements so that the plan selected would fit into future system expansion. Usually, however, some penalty must be assessed against pumped storage for added transmission.

Also, it is likely that pumped storage transmission will disrupt previously planned expansion patterns, forcing loading on lightly-loaded lines and advancing the time and probability of overloads. This might be corrected when the conventional plan is activated; if not, means for correcting troubles must be devised.

Stability considerations are compounded by the remote location of this generation from the core of the system and by the necessity of maintaining stability during both pumping and generating operations. The two operations provide two different bases for evaluation in determining stability of the plant.

Remote location of the plant with its extended transmission facilities will tend to increase system losses. Required flow in both directions will further compound these losses. Also, since the pumped storage plant will disrupt previously planned expansion patterns in transmission facilities the basis for evaluating system losses is changed.

Since the selection of pumped hydro storage as the next capacity addition will disrupt previously planned expansion patterns and since it will change many basic considerations determining future transmission design, new and different future system transmission expansion patterns must be developed. Effect and cost of these changes must be considered.

Comparative Capital Cost

Lower capital annual charges of a pumped hydro storage plant compared with conventional steam provided the incentive to construct such a plant. This was further enhanced by longer expected life with its lower depreciation rate. Attractiveness of pumped storage also held up when compared to conventional hydro because necessary dams could be smaller and the smaller watershed allows omission of major components such as large and costly spillways. In order to offset the energy penalty entailed with pumped hydro storage, however, its annual capital charges must be considerably less than those of a conventional plant.

Operation

Generation from the Taum Sauk plant will be required in the upper peak portion of the system load curve whereas pumping will be done in the valleys. This will dislocate generation in both time and location. Hence, the plant capacity is a function of the amount of capability that stored energy must provide in worst conditions when inserted into this zone. Thus, plant capacity will become a function of the shape of this load curve.

Pumped hydro storage fits into a system which already contains some hydro differently than into an all-steam system. Existing hydro, with adequate storage, satisfies the uppermost portion of the load and pumped hydro storage must then provide for those requirements just below existing storage hydro cut-off. Thus, a pumped hydro storage plant can underwrite a somewhat larger capability in an all-steam system than in a part-storage hydro system. If existing hydro consists of small units, however, it provides the added advantage of being able to vernier generation available from larger pumped hydro storage units, permitting them to be operated in their optimum efficiency range.

Economy power flow towards the owning company may tend to en-

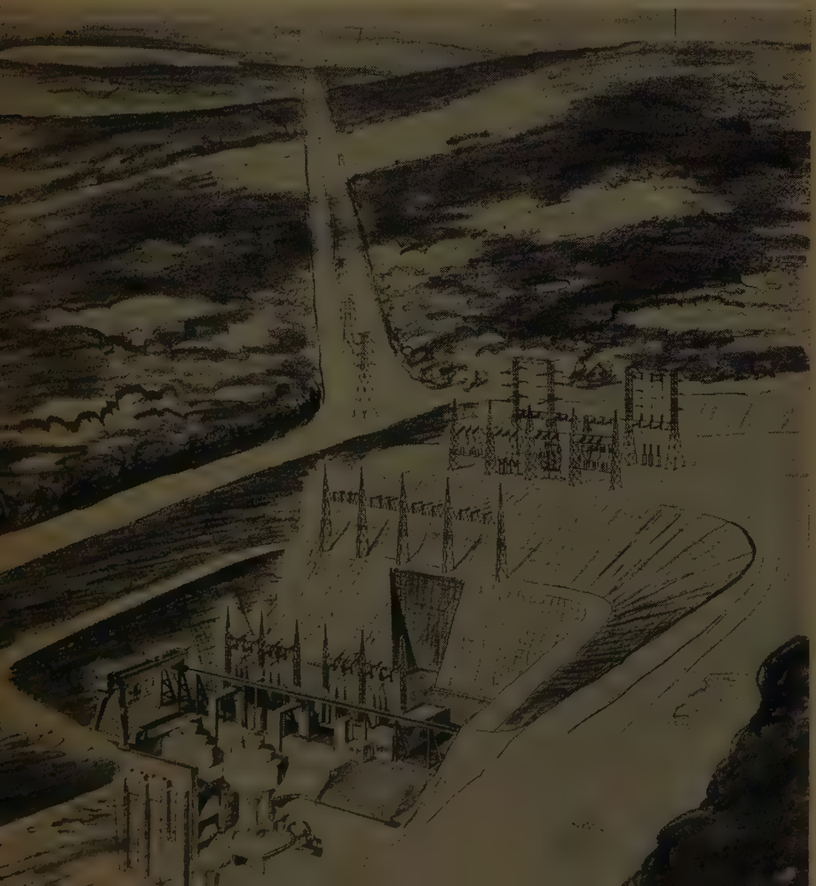


Fig. 3—Artist's rendition of the power plant with its associated substation and transmission facilities; center towers between power plant and substation have been eliminated in final planning by raising towers at both ends of the span.

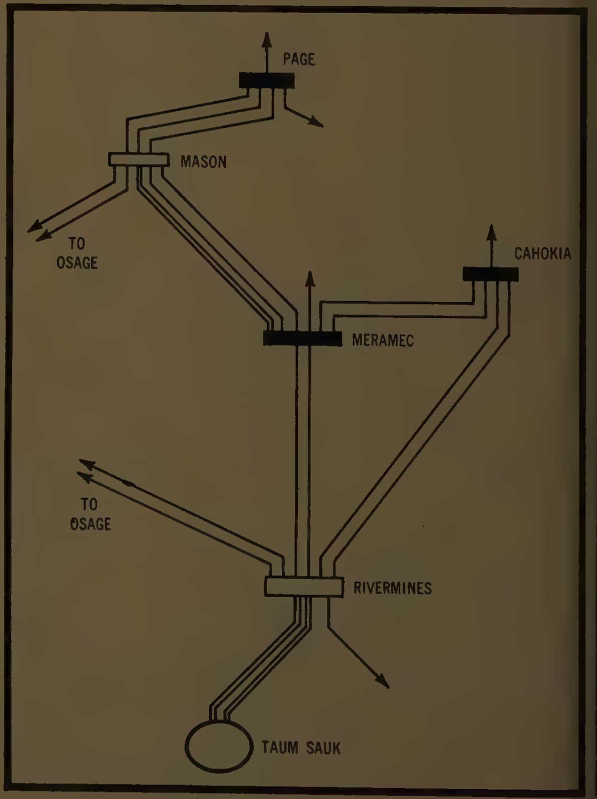


Fig. 4—Relationship of the Taum Sauk development to other system components.

ance the capacity of a pumped ydro installation. Since economy ower is usually interchange beween adjacent systems with comarable load shapes, availability or ow of economy power tends to inrease as load falls off. This proides a "shoulder trimming" effect n the load curve and can reduce he amount of energy required to nderwrite a particular capability.

Plant Rating

Rating of a pumped hydro plant s related to many factors. Machine apability must be such that it will llow using available energy in uch a way as to maximize capability. The amount of storage, both ipper and lower, must be adequate o provide the energy required to nderwrite this capability. And, ating is dependent on the shape of he system load curve as modified y existing hydro and other factors. t is those requirements remaining fter use of existing storage hydro nd economy power that must be atisfied by pumped hydro storage.

Furthermore, shape of the system oad curve must be such that it will llow restoration of the upper pool luring the following valley. In general, the lower the load factor the reater the incentive to construct a pumped hydro storage plant. The amount of water, thus energy, that an be restored to the upper pool ertainly dictates a limit on plant ating. Thus, the ratio of pumping o generating capacity is of considerable importance. Pumping rates should allow restoration of the water supply in the upper pool durng the minimum hours available or such restoration during the load valley.

An interesting observation with regard to plant capability is that he rating of a pumped hydro storage plant should increase with load growth. As load growth is encountered, the top portion of the daily load curve will tend to become somewhat more peaked and, thus, the same amount of stored energy will be able to underwrite a greater amount of capability.

Economics of Operation

It is typical of any type of peakng plant that it is primarily intended to be a capacity plant with little energy flow. Economies result by accepting some premium cost for this small amount of energy in order to achieve significant reductions in annual charges required to provide the needed capacity. Since little energy flow is required to support capacity needed for peak portions of demand, some increase in energy cost can be absorbed by significant reductions in carrying charges associated with peaking capacity. These two concepts provide the justification of the pumped hydro storage cycle.

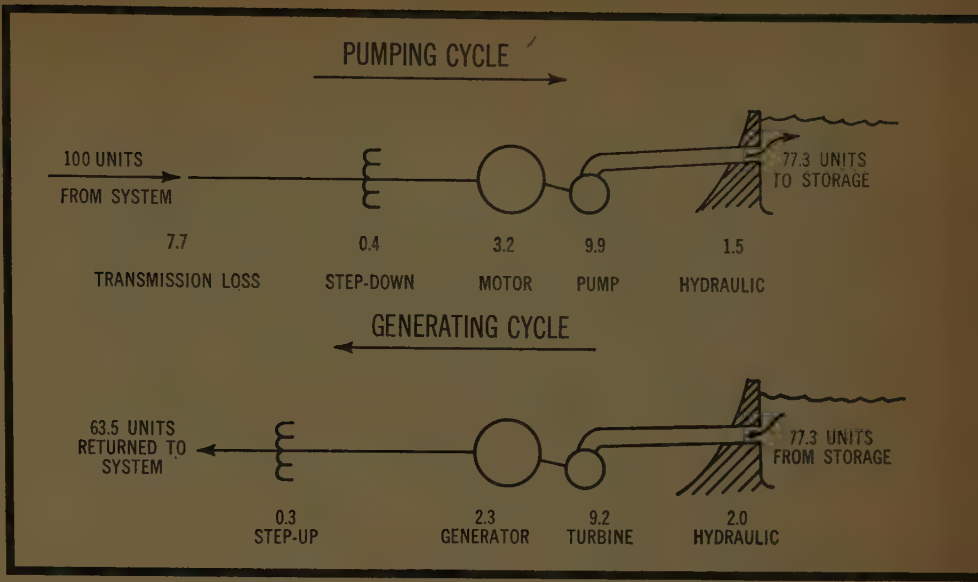


Fig. 5—For every 100 energy units required from the system for pumping, 63.5 units will be returned to the system; diagram at top illustrates anticipated losses in the pumping cycle; diagram at bottom shows expected losses in the generating cycle.

The ability to absorb some increased energy costs allows for the conversion of conventional steam generation during load valleys to hydro generation during peaks. A pumped storage plant, then, becomes a coal-burning hydro plant, its generation having a real incremental cost, as opposed to conventional hydro. This cost is the cost of the steam generation required for pumping, compounded by the losses in conversion through transmission and the hydro storage cycle. On this basis, about two kilowatt hours will be delivered for every three delivered for pumping energy. (See Fig. 5.)

Energy Penalty

The energy penalty that must be assessed against a pumped hydro storage plant derives from two sources. First, the losses incurred in pumping, storing and generating (the cycle losses) provide a cost or penalty to this plant. Second, an additional penalty is imposed on the system, for, were a high-efficiency-base steam unit added to the system rather than the pumped hydro storage plant low-cost prime energy would be available that would not be available from the latter scheme. These combined energy penalties must be absorbed by reductions in capital charges in order to make the pumped hydro storage installation attractive economically.

An interesting point in connection with pumped hydro storage is the fact that any future reduction in system fuel costs will be reflected in lower pumped storage costs. Thus, pumped storage may be considered to be "self-modernizing."

Other benefits favor application of pumped hydro storage to a system such as Union Electric's. It will smooth out load requirements on system steam plants and thus provide a more favorable use factor on these plants. Maintenance costs on a per energy unit and perhaps generation costs may be reduced on these plants.

Manning costs of the pumped hydro storage plant will be less than for a conventional steam plant. And, since energy available from pumped storage can be utilized quickly, steam plant spinning reserves can be reduced with resultant fuel savings during those periods when pumped storage is not being used.

Signing power pool agreement is C. J. Foresberg, WP&L president while H. P. Taylor, WPS president (left seated), G. S. Meyrick, WPS vice-president (left standing) and J. D. Howard, WP&L vice-president (right standing) observe the procedure.

POWER POOL HAS "FLYWHEEL EFFECT" ON INCOME STATEMENT

WP&L and WPS sign Power Pool Agreement after five-year study reveals savings will be substantial.

By J. D. HOWARD, Vice President, Wisconsin Power & Light Company and
G. S. MEYRICK, Vice President, Wisconsin Public Service Corporation

FIVE years of joint study and negotiations by Wisconsin Power and Light Company and Wisconsin Public Service Corporation was culminated in a Power Pool Agreement which was executed on December 29, 1960.

Problems Solved By Pooling

It became apparent that reserve generating capacity had become a major problem for both companies and that there were instances when one company had high reserves while the other company had low reserves. The Power Pool will take full advantage of this type of situation.

In recent years both companies have been installing generating units equivalent in size to about three-years' load growth. The newest units have been 75 to 100 mw and are considered the largest machines economically feasible for the size of the companies involved. As a result of the Power Pool larger reheat units are expected to be found feasible and, therefore, lower investment costs per kw and better heat rates will be possible.

Because interest during construction is charged to the cost of the plants, it has been a feast-to-famine process on the income statement. Interest during construction goes direct to net while a plant is being built, then comes the impact of full fixed charges becoming costs upon placing the plant in commercial operation. A flywheel effect on the income statements of both companies is expected to be produced by sharing the fixed costs of new generating units.

Fortunately, the two companies involved operate in adjacent territories and are approximately the same size, so that benefits from pooling are expected to be divided equally.

Territory Served

The combined area served by WP&L and WPS reaches from Illinois to Michigan and includes customers in 43 of the 70 counties in Wisconsin. These two utilities supply electric service to 369,000 customers and have a combined peak demand of about 750 mw.

Intent Of Power Pool

Two paragraphs from the Preamble of the Power Pool agreement express the intentions of both parties:

"WHEREAS, the participants' desire, for the purpose of making most effective use of power generation and transmission facilities, and for the purpose of supplying economical and reliable electric power to their respective customers, to purchase from and sell to each other capacity and energy, and

"WHEREAS, the participants' desire to establish the terms and conditions under which coordinated installation and operation of generating and interconnection facilities shall be effected."

Benefits Expected

Through joint planning for the system capacity additions, some of the contemplated benefits are:

1. The average reserve capacity in future years will be lower than it would be on an individual planning basis, thereby saving considerable investment and fixed charges over the long term.
2. The impact on the income statement of each company will be reduced when a new unit goes on the line because such capacity will be shared.
3. Interchange of economy energy may permit greater use of the most efficient generating units and it may be possible to ultimately install larger units, thereby reducing the investment per kw and attaining better heat rates.

Other Pooling Agreements Studied

Probably all of the presently-effective pooling agreements in this country were reviewed by the administrative committee. Members of this committee are: G. S. Meyrick, vice president, and G. F. Hrubesky, power engineering supervisor of Wisconsin Public Service Corporation, and J. D. Howard, vice president and L. M. Abrahamson, manager of power production for Wisconsin Power and Light Company. Previous work done by other companies was helpful but the latitudes of variations between them were so wide that it was felt impossible to strictly follow the pattern of any one existing agreement.

Wisconsin Utilities Interconnected

For many years the major electric utility systems in Wisconsin have been interconnected for interchange of emergency power. It has also been the practice to schedule down time for maintenance of units through a joint committee. Therefore, there is no immediate need for additional transmission and substation construction to provide interconnections. Also, spinning reserve has been shared between the interconnected companies on the basis of losing the largest generating unit operating on the interconnected system.

Agreement Kept Simple

After consideration of many approaches to the various features of the agreement, it was concluded that it should be kept in the simplest possible form. The date when inter-company billings will commence is December 1, 1963, and the agreement is to remain in force a minimum of ten years with three years cancellation notice. However, it is contemplated and expected that it will be perpetuated far beyond the ten years.

Administering The Agreement

A four-man operating committee, two from each member company, is responsible for administering the agreement and for joint planning. Some of the major responsibilities of the committee are:

1. To establish operating and maintenance schedules, and control and operating procedures.

2. To assign spinning reserve requirements to each Participant and to set up procedures so that each Participant may from time to time receive information from the other as to the amount of anticipated load

WPS Weston Plant located near Rothschild, Wisconsin. Unit No. 2 was placed on line November, 1960. Plant capability is 153 mw.

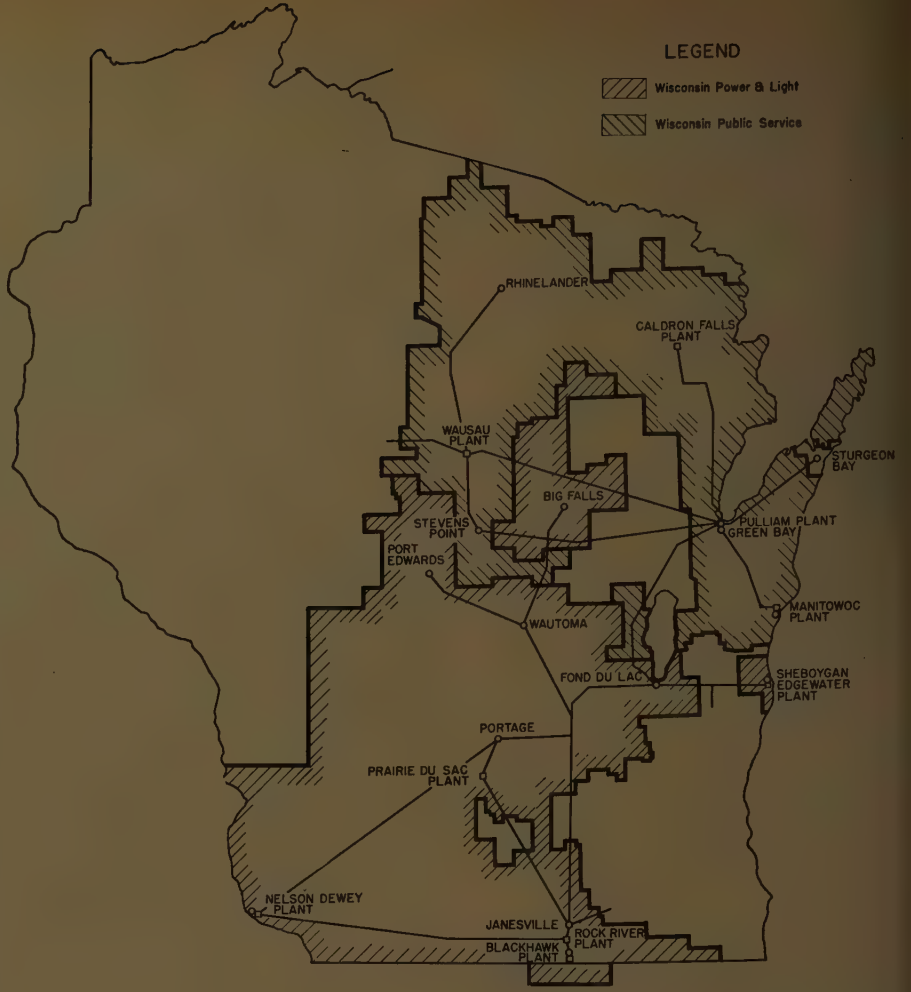
WP&L Nelson Dewey Plant located at Cassville, Wisconsin. Unit No. 1 (100 mw) was placed in service December, 1959. Second 100-mw unit now under construction is scheduled to be on the line December, 1962.

and generating capacity available—so that each Participant shall be prepared to carry under this agreement the spinning reserve requirement assigned.

3. To establish limits within which each Participant shall supply its own reactive kva requirements so that voltage may be controlled with reasonable flexibility at various points in the Integrated System.

4. To review—at least quarterly—the capacity situation of the Participants and the expected future load growth on their respective systems and to make recommendations to management with respect to any increase in capacity required to meet such load growth.

All facilities made available by a Participant for the Integrated System operation remain the property of such Participant and each will continue to direct the operation of its own system and facilities.



Territory served by Wisconsin Public Service and Wisconsin Power & Light companies showing the major transmission network.

Types Of Energy Defined

Interchanged energy is classified as either "scheduled" or "regulation." Scheduled energy may be Contract Energy, Emergency Energy or Economy Energy. By definition, *Contract Energy* is firm energy delivered upon the request of the participant purchasing capacity at a rate of delivery not to exceed the capacity deficiency. *Economy Energy* is energy which one participant may request from the other in order to reduce its production cost of energy.

Capacity Costs

Capacity deficiency, which is the excess of a participant's capacity responsibility over such participant's accredited capacity, is to be billed at $1.67 per kilowatt per month. From the variations found in other pooling agreements and our own calculations, this capacity charge can and does run anywhere from 60¢ to $2.70 per kilowatt-month. The $1.67 in this agreement was established after much discussion, and is a compromise approximating the incremental cost of, say, increasing the size of a unit to be installed from 100 mw to 150 mw.

Contract energy is to be billed at 0.5¢ per kwh; economy energy is to be sold on a 50/50 split savings basis, the committee determining the costs; and emergency energy is to be billed at 1¢ per kwh, which is the same as the rate for emergency energy among the presently interconnected companies.

Existing Agreements Not Affected

It is contemplated that this pooling agreement will have no effect on other existing interconnection and emergency energy agreements.

Other Possibilities Considered

Many other possibilities were considered such as basing the participation capacity charge on the actual cost of the most newly-installed generating plant—excluding site development costs; basing the contract energy billing on a cost formula; and taking into consideration inflationary factors. However, it was concluded that since only the two companies are involved in this agreement and since the operating committee can at any time, based on experience, change any of the numbers, simplicity was important and most desirable.

Substantial Savings Expected

The savings to be gained in the future, of course, depend directly upon how future loads increase, since load forecasting directly affects the dates of bringing new units on the line and their capacity. Both companies are now re-studying their load projections so that the committee can soon arrive at the best estimate of combined load growth for the years immediately ahead. Suffice to say that if our calculations are correct, the savings will be very substantial and that the "flywheel effect" on the income statements of both companies due to sharing the costs of new units will have a very beneficial effect.

ARBORIST CALLS UTILITY-SPONSORED TREE PROGRAM 'BEST IN WORLD'

Some planning in tree plantings and line placement, and a little give and take on both sides, can beautify city, improve relations and cut maintenance.

By **EDWARD H. SCANLON,**
Edward H. Scanlon & Associates,
Consulting Arborists

TWO trips to Europe (1957 and 1959) and a round the world tree hunt last year have convinced me that the Long Range Tree Planning Program sponsored by the Cleveland Electric Illuminating Company is the most advanced, concentrated project of its kind.

The trips mentioned took me to 24 countries and 45 cities, from Moscow to Melbourne and many places between. The purpose was to study the intensity and degree to which principles of street tree space had been interpreted and invoked in these older cities and countries around the globe.

The one indelible impression gleaned from these travels is that in every country, trees along streets are considered an indispensable part of human habitation. Only in the poverty stricken hovel villages of rural India was there lacking an attempt to use trees for comfort and pleasure.

The most advanced thinking in use of trees on streets was observed in a number of Dutch cities. Many outstanding examples of functional tree use were also found in Brussels and Ghent. Zurich, Berne and Lausanne are outstanding in Switzerland, and in England and Ireland there has been a very strong trend away from forest giants in villages and along roadsides.

The most concentrated area of the extensive about-face in the switch from impractical conflict ridden forest giants to trees of much smaller stature was found in a dozen or so Dutch cities where they long ago discovered the error of using big trees which grew easy, fast and dangerous. Their new program has been based on planting big trees only where there is sufficient space for the tremendous root systems and far reaching crowns of elms, planes and other huge trees. In round figures during the past 35 years they have replanted their streets with 90-percent small trees. And remember this—*the utility wires in Holland are underground.* The small tree idea just makes sense.

However, outside of height and form considerations, the Dutch cities have no plan to follow. A plan, however, is the thew and sinew of the program for municipal embellishment launched by Mr. L. C. Howley, vice president and general counsel of the Cleveland Electric Illuminating Company in 1954. Without a Master Street Tree Plan a street tree program is like a bull in a china shop—as has been proven on thousands of streets in scores of American cities.

The program launched in 1954 was a combined public relations effort to (1) provide a service that towns and villages needed badly and (2) prevent further expensive conflicts that accrue, both to the municipality and to the public utility, when the wrong trees are planted. The basic idea was to foster a program of proper tree use—trees that would fit the available space—large or small.

In 1954 it was realized that the tremendous expansion of home buildings would eventually increase the line clearance cost potential to a staggering point if the same tree mistakes were continued. With over one million dollars per year being spent in this department by The Illuminating Company, the Long Range Tree Planning Program was embraced enthusiastically as the only common sense approach to holding the line and eventually to effect a very significant reduction in this undesirable and nonconstructive function.

The program was not easy to plan. There was no precedent on which to base a modus operandi. However, experience dictated the needs and, as time has shown, proved the methods successful. Only a year after the program's inception, The Illuminating Company received the Silver Anvil Award from the American Public Relations Association for meritorious public relations performance in the field of public utilities.

The first step in the CEI program involved publication of a beautiful four color brochure titled "Trees You Can Live With." The central theme was to point out that various forms of trees are necessary to fit space combinations encountered from one street to the next. Representative trees were listed and briefly described, including a number of new selections we made based on experience with street needs. This is the point at which most utility tree programs cease—but the brochure was just our beginning.

It is wishful thinking to expect a brochure to do the job alone. It is only a shotgun approach at best.

A pole project in Bombay . . . don't know what they are doing, but they are busy. In the foreground is a one camel-power truck.

Merely putting a list of trees in the hands of people who are totally unfamiliar with the cultural requirements and peculiarities of these trees cannot achieve tangible results. This can be likened to a doctor handing a sick patient a list of pills and telling him that among the variety is one that will cure him. At least the doctor's patient will find the right pill a lot sooner than the "patient" who starts on a list of trees—he will have to wait at least 15 years to determine whether the first "pill" worked.

The m. o. is based on the preparation of a Master Street Tree Plan which encompasses a survey and evaluation of the site factors of every street in the town or village. Following this, an official tree is designated for each street with instructions regarding the best planting size and spacing distance. Such a plan is prepared without charge on request of the Mayor of the political subdivision.

From the beginning, the policy has been that municipalities would not be solicited just for the sake of piling up a big score. The Mayors were informed by mail that the service was available and the next step was theirs. As we received requests for additional information, meetings were arranged with the city councils to present an illustrated slide lecture.

Briefly, the lecture points out serious mistakes made in past street tree plantings and illustrates the high ornamental value of small flowering trees. Reasons are given to explain why it is imperative to have and use form trees such as globes, columnar and conical selections.

The mechanics of the Master Plan are explained as well as the basis on which a tree is selected. The plan lists 17 site factors; however, the basic seven are: (1) width of "tree lawn" (space between curb and sidewalk); (2) setback of house on building; (3) width of street; (4) direction of street; (5) height of overhead lines; (6) type of street lighting; and (7) soil.

There are numerous combinations that can be formed from these seven factors and for the sake of explanation I shall mention two: (1) shallow setback and narrow treelawn. This combination could only accommodate a tree of narrow silhouette and to prevent sidewalk and sewer disruption it would need to have a small trunk caliper potential. (2) Wide setback and narrow treelawn. This combination would call for a tree with a bit more aerial bulk but small trunk caliper. Tree selections must be made on the basis of size the tree will attain over a period of 45 years.

Of paramount importance is the moral taught by the numerous losses cities incurred from Dutch elm disease: *No one species should be used in excess of five or ten percent of the minicipal tree population.* It is impractical to think that any single tree can do the job or should dominate the planting of a city.

In addition to the MSTP, The Illuminating Company has published several brochures for distribution at area flower and home shows, club meetings, etc. We have available the original "Trees You Can Live With" as well as "The Master Street Tree Plan And What It Can Do For Your Community;" "Bury Me Not" (a how-to-plant a tree pamphlet); and the newest, which will be ready in February, "How To Select A Tree."** These educational *publications have helped immensely* in gaining public acceptance of the program.

We also publish a quarterly newsletter that is mailed to mayors, service directors, councilmen and persons engaged in supervisory street tree work. This is a six-page, slick, newspaper type edition with stories and pictures of plantings in various municipalities. The newsletter has incited a form of competition among municipalities and serves to report tree projects and experiences with new trees in the Northeast Ohio area.

The program also includes consulting services for communities that have no regular arborist. In the Fall of 1959 we began receiving calls from service directors requesting information about maintenance of the newer trees. Foreseeing future calls on the same subject, The Illuminating Company agreed to sponsor a Street Tree Clinic which was held in January 1960. The clinic, first of its kind in the country, was an all day session attended by about 150

**copies of brochures mentioned may be secured by writing Mr. Scanlon at 7627 Lewis Road, Olmsted Falls 38, Ohio.

This overhead construction might be interesting as are the rubber trees which are much too large for the site. We don't make all the tree mistakes.

A rubber tree (Ficus bengalensis) cleared for overhead lines in Bombay.

municipal street tree officials in the company's operating area. Although the clinic will probably not be an annual event, we have scheduled another for April of this year.

As a result of these combined efforts, 51 Master Street Tree Plans have been completed in Northeastern Ohio. A plan, however, is not enough. City administrations change. For this reason, when a plan is presented to the Mayor and Council it is also suggested that it be made a part of the street tree ordinance. As the official, legal tree plan for the city it is then carried over from one administration to another. Most communities have followed this suggestion.

These plans can only be counted as "men on base" and as everyone knows it takes a "run" to win a game. The "runs" scored to date from this program total between 25,000 and 30,000 trees—and this mass controlled planting represents trouble-free trees.

Projected to 1975, a time when the wrong trees would be adding to the line clearance bill, The Illuminating Company will have instead a savings of at least $100,000 per year. Also, by 1975, even at the present rate of planting in our Master Plan cities, there should be 60,000 additional trees planted. This, plus the losses of current liability trees through destruction, removal, or disease, should effect a line clearance reduction many times in excess of the cost of the Long Range Tree Program which, remember, requires long range thinking.

A by-product of the educational

The charming, practical Kwanzan Cherry on a street in Rotterdam, Holland. This planting is two miles long and was planted 14 years ago.

value of this program came about in one of the larger cities in the operating area. The principal street was lined with elms and overhead lines on both sides. The trees had to be reduced to less than 30 feet, and an annual costly clearance project was necessary. After the program had progressed through the lecture and plan stages, it was possible to show the public officials how these misfit trees, which were also rapidly being affected by Dutch elm disease, would be better off if removed and replaced with a tree that would only grow to about 25 or 30 feet. After they saw a picture of a street of flowering trees in bloom they agreed to replant with Kwanzan Cherries. Most municipal officials agree that it makes sense to plant trees that will only grow to a little less than the maximum allowable height. The removal of the trees on this street effected an annual line clearance savings of $6,000. In addition, the new trees are beautiful in bloom, handsome in leaf, and will not require a costly hair cut each year to obtain the same round form that was artificially and expensively imparted to their predecessors. And think of the aesthetic addition to this city—nearly three miles of flowering cherries in the Spring—much greater in extent than the famous display in Washington, D. C.

As a result of the enthusiasm engendered by the first flowering of young cherries along the main thoroughfare of this town, a bond issue for $150,000 was approved by the electorate for the establishment of a park department and a tree program. Since its passage, over 3,000 trees have been planted according to the Master Plan and 1,250 large troublesome trees have been removed—at public expense.

We have based this program on selling the municipalities the idea that they should buy the trees to be used on their streets. Trees are as important a public function as roads, sewers or garbage collection and the city that neglects its trees is remiss in its service to the public. To purchase the trees for a city would be a colossal and a mighty expensive mistake. The care given them would not be the same as it would be if public money had been used for their installation. This policy has meant a more difficult selling job, but once it is sold you have a municipal sponsored program that is respected by the public.

Most utilities seem to have accepted the fact that line clearance costs are here to stay. They continue to construct lines in, through, or over existing trees while tree planters continue to plant American elms, or some other such out of scale trees, under 35 foot lines.

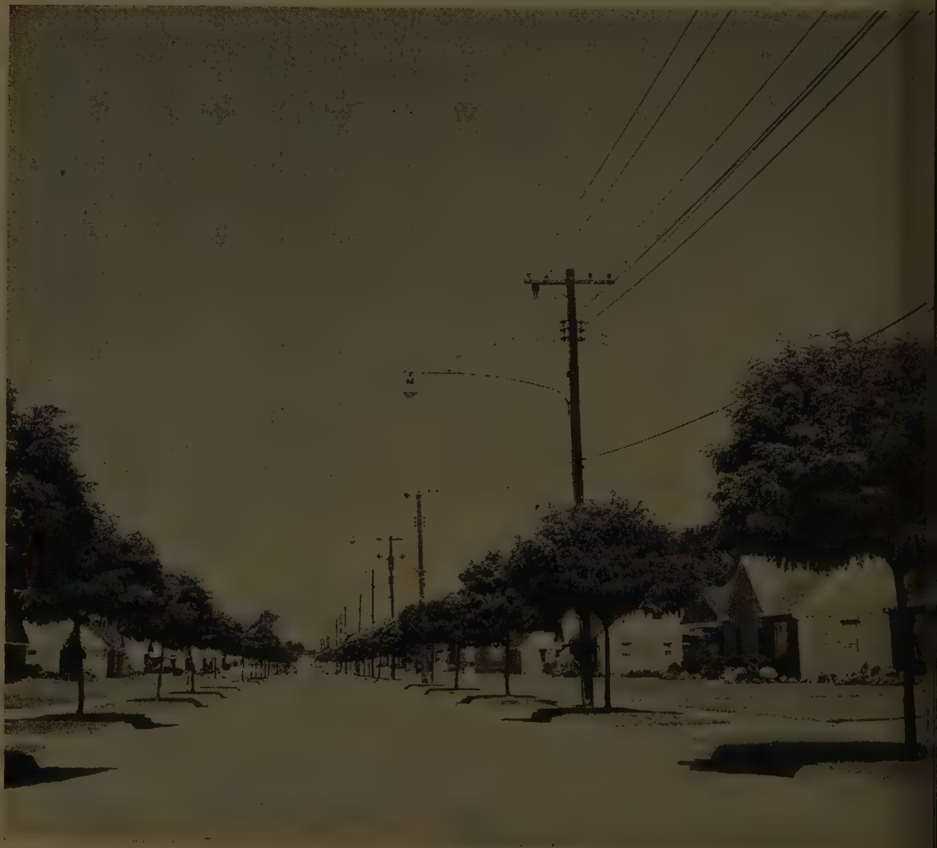
We have the trees. All we need is to apply diligence to the evaluation of the space available and fit a tree to that space. At the same time the utilities can exercise a little flexibility in their installations. They have been just as provincial in their method of doing things as the tree planter has in his.

There is ample flexibility in both the selection of a tree and the manner of installing a powerline, street lights, or trackless trolley, to insure an absolute minimum, and in many cases a complete absence, of conflict.

Some years ago, when I was commissioner of shade trees for the City of Cleveland, I observed an installation project of the Muncipal Light Company. The company was installing poles in a 25 foot center strip planted with huge American elms. The poles were erected about four feet from the base of the tree trunks. I voiced disapproval because the tree tops would have to be cut in order to hang electroliers on the poles. The company then agreed to stagger the poles as the trees were. That is, the trees were planted at 50 foot intervals beginning at the end strip and the poles were installed at 50 foot intervals beginning 25 feet from the end strip on the opposite stagger. In the next step though, the company intended to run the lines on a straight line,

(*Continued on page 69*)

Globeheaded trees, especially smaller varieties, are an indispensable tool in the window dressing of a city. These are Globe Locusts on a Cleveland street; the planting is six years old and will mature at 16 ft, never requiring trimming to clear wires. They present balance and symmetry to the installation.



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- SNAPACT *controlled action* switches can be used for many applications presently served by the Type RA switches. They are available in 5, 7.5, and 15 kv, full 400 ampere load break ratings.

Complete information about this new development is available through a nearby G&W representative or by writing to the G&W Electric Specialty Co., Dept. D.

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D60-1

PEA Planning Committee Deepens Probe Into System Growth Problems and Continuity

Transmission, distribution and generation growth requirements plus their continuous service were investigated and analyzed at the Pennsylvania Electric Association System Planning Committee meeting in Philadelphia February 20-21. Chairman is W. U. Baum, Pennsylvania Power & Light.

How Philadelphia Electric integrated Eddystone Station's 650 mw optimally through five radial 132-kv lines was discussed by P.E.'s Emil Kassum. Eighty-two miles of these lines are overhead; 58 miles run on railroad right-of-way; and 13 miles are in underground cable.

Overhead 795-mcm conductor is rated 1100 amps normal and 1240 amps one day emergency. The 2000-mcm underground is rated 900 amps with a 1210-amp emergency rating. "This high-rated cable assured economic success," Mr. Kassum said. All lines are designed for emergency operation.

For stability, clearing times for near-in faults are 10 cycles; for remote faults, 30 cycles. In the substation, two busses are tied through a reactor whose Xl is from seven to 18 ohms. It allows a phase-to-phase fault on one bus without upsetting stability on the other.

On a total cost basis, is it wiser to add huge, highly-thermally-efficient machines for base load, or to add intermediate or peaking machines? Philadelphia Electric's J. J. Ray felt the answer lies in a study which considers the many possible combinations of base load, intermediate and peaking units. By taking annual costs and fixed charges, reconciling them to existing machines and relating these factors to load in the next 30 years—all on the digital computer—optimum new generating unit selection can be made, he said. The computer, as programmed by P.E., gives up to 14 plans on one pass. On each plan the computer lists accumulated annual costs and maximum and minimum limits of group reserve for each plan. In interconnection planning, the entire pool is considered as one company.

Charles A. MacArthur, Pennsylvania Power & Light explained a superposition method for determining transmission capabilities. His method can handle up to 40 lines, of which any 15 can be open. The method can define five areas and work them against each other with a total of 25 generators.

How his company peered into the future in distribution planning was discussed by Fred Wilcutt of Potomac Electric Power. An idealized system for his company would be 230-kv transmission, 69-kv subtransmission and 80-mva substations with radial 13-kv feeders.

With a criterion of best service to customer at least service cost with no retrogression in reliability, the company allows its load per feeder to go up as the square root of the coincident customer load per feeder.

H. L. Collins, Pennsylvania Power & Light, reported steady service performance improvement in his company. But storms and customer dependence led PP&L to conduct a special project aimed at continuity improvement. Three areas covered are: (1) selective modernization of distribution aimed at reducing failures through built-in reliability; (2) additional protection and automation of distribution to restrict the effect of failures to smaller areas and reduce the duration of outages; and (3) service and facility performance records.

Since 75 percent of the company's load flows in main-line sections of its 12-kv feeders, they were targets for improvement all the way from conductor configurations to pole construction.

PP&L philosophy on additional protection and automation is (a) to clear all faults in minimum selected time; (b) restore service after transient faults with fast automatic reclosing devices; and (c) to confine interruptions from persistent faults to the smallest practicable area. The company is investigating use of sectionalizers.

"Frequency and severity (of outages) will tell us the most about the kind of service we are rendering," Mr. Collins said. He described a record keeping system, now being established, which lists equipment and material failure data and detailed interruption data including weather, cause and system component failure.

When the records are analyzed for outage frequency, those facilities which show two-, three-, or four-time interruptions will get immediate remedial action. Each customer can be pin-pointed by a 14-digit number which includes system division, substation, line, section, tap, transformer and pole identification. The record system will also make feasible a complete load study annually.

Mr. Collins was asked how outage time start and finish were determined. He replied, "Take the time of interruption as the time of the first service complaint unless known otherwise."

Several subjects for future discussion were aired in the subcommittee reports. Some of them include: (1) a canvass of utility research and development departments; (2) economic studies on the high-use customer; (3) automatic sectionalizing; (4) economics of voltage-drop allocation; and (5) 440-v secondaries.

In generation, the following subjects were included: (1) unit retirement; (2) load-duration curve analysis with regard to planning; and (3) economic aspects of locating small units which would use waste fuel or customer by product fuel.

Transmission subjects to be investigated include: (1) 69-kv aerial cable; (2) reactive supply and voltage control; (3) pools and interconnections; (4) energy transportation; and (5) optimum size of generating units as affected by system interconnection.

Service continuity will be discussed in the light of how distribution components fit in.

Original "straight-through" design

This "look" on a pole means

KPF

There's no mistaking the clean, pleasing pole top appearance of KPF switches—the original "straight-through" design. This design means lower cost, trouble-free service, no lubrication, virtually no maintenance. Installation may be made in the air or on the ground, on hot or dead lines, with phase units in horizontal, triangular or vertical array. Installation time is half that normally needed; no extra dead end insulators or heavy extra mounting structures are required.

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Tagging and Grounding Practices Get Nod From PEA T&D and Operating Committees

Tagging and grounding were thoroughly discussed at a joint meeting of Pennsylvania Electric Association's Transmission and Distribution and Systems Operation Committees February 9 in Harrisburg, Pa. Discussion was kicked off by presentations of two different types of company practices. Pennsylvania Electric's practices—in a spread-out system—were discussed by A. R. Cranston and G. H. Huston. J. B. Murray and S. S. Clair explained Philadelphia Electric's methods, in light of a relatively concentrated system.

At Philadelphia Electric, the load dispatcher has the primary responsibility for providing proper blocking and he achieves this objective with the cooperation of generating station switchboard operators, substation operators, and the trouble dispatcher in Philadelphia division. The actual blocking is done by generating station electricians, substation operators, and troublemen according to the location of the equipment. In Philadelphia division the trouble dispatcher relays the blocking instructions to troublemen, while in suburban divisions the load dispatcher deals directly with troublemen.

At Penelec, the system operator is the tagging authority and may be either the load dispatcher, the local superintendent or general foreman, as the case may be. All switching and tagging on transmission, subtransmission and substation equipment is ordered by the regional dispatcher having jurisdiction. Low voltage distribution clearances are handled by the local superintendent or general foreman, except where the distribution circuits also serve as inter-substation ties. With regard to station grounding switches, little or no dependence is placed on them. A limited number of such switches exist in Penelec substations.

During the discussion it was revealed that most of the PEA companies attending do not give outside contractors authority and responsibility for clearance from the issuing authority such as the load dispatcher.

Since today's systems are getting more complex, both Philadelphia Electric and Penelec ask for at least 48 hours notice before a planned outage line is cleared. At P.E., any outage which comes about in less time is classified as an emergency, and is handled arbitrarily depending upon conditions.

Grounding methods and philosophies took heavy discussion. E. E. Heath of Niagara Mohawk encouraged point-of-work grounding because the actual electrical ground lies below the surface of the earth and must be reached through tower footing resistance. R. Youtz of Connecticut Valley Interchange recommended reading the article, "Problems in Safety Grounding for Line Work," which appeared in January 15, 1961, Electric Light & Power for new ideas on the subject.

On aerial cable grounding practices, A. Laws of West Penn Power suggested that this type cable be handled the same as underground cable.

Potential testing, including the advantage and disadvantages of buzzing with a switch stick, and potential indicating devices were discussed. Con Ed described its potential testing device which in essence is a string of series capacitance on a long stick, tapped by a biased glow-discharge tube. Baltimore Gas & Electric's device is a transistorized audio oscillator in a 4 in. x 8 in. box which is triggered by presence of potential. It will handle 4 kv as well as 110 kv, according to Mr. Walsh.

In a show-of-hands query, the following information came to light: Five PEA companies record both sides of a switching conversation. Half of those present require the actual switcher to talk to the dispatcher. Of seven companies that have tape-recording in their dispatching offices, five record all orders.

Most of the companies attending, see to it that when a line outage is planned for one department, all other concerned departments are notified so they can work on the line, too, if necessary.

R. D. Nelson, president, R T & E, in marking trends in residential underground distribution practices, referred to "the inevitable coming of residential underground." "We can't stop it," he said. "We predict that in 10 to 15 years all new residential distribution lines will be underground. In 30 to 40 years, whole systems will be underground."

Personalized, Basic Selling Tools Best, MVEA Commercial and Industrial Sales Group Told

The best way to sell more load is to personalize your sales approach, sell service and convenience, and put it all in terms of what these things mean to the customer, members of the Missouri Valley Electric Association Industrial and Commercial Sales Section were told at their recent meeting in Kansas City.

And if success is to be ensured, the selling must be consistent, backed up with a good promotional program, and there must be assurance that the load is the right kind to be beneficial to the utility.

Reports and Brochures Open Doors

Harold S. Nay, Kansas Gas & Electric Co., pointed out that the commercial or industrial salesman can often accomplish more with a brochure or special report than by any other selling technique. KG&E has been using this sales tool for some time and the results have been excellent. In preparing the report, which should go into as much detail as is necessary to be complete, but be in language the prospect can understand, it is important to be sure that the material is completely factual, must help the prospect reach a conclusion, and should ask for the order.

Sell IES Standards

The demand for higher lighting levels is demanding more and more of lighting engineers, according to Dean Barnhizer, Iowa Electric

Light and Power Co. And as knowledge of lighting techniques becomes broader, the responsibilities thrust on lighting salesmen become greater. At the present time, learning the application of good lighting is more of a problem than just selling the lighting load.

The salesman must learn to evaluate the needs of a customer in terms of what type of job the lighting is to perform; whether it should provide a level of light for close, eyestraining work such as drafting, or general illumination for factory machine operation. In addition, the salesman must evaluate the proposed installation in terms of lighting color, intensity, relation to other environment, and cost. The interest is now on the quality of light, not just the amount. The salesman must also see to it that the prospect can have more and better light with a minimum of personal effort.

In the same general area, E. J. Cook of the St. Joseph Light and Power Co. pointed out that floodlighting is good off-peak load. He stressed the importance of *demonstrating* to the prospect what adequate lighting can do for him. In this way, one job can lead to another, and the salesman's job is made easier.

Electric Cooking Needs Demonstration

The biggest problem standing in the way of selling more electric commercial cooking is the difficulty of finding an adequate way to demonstrate to a prospect just what electric cooking will do for him. Richard F. Rice, Kansas City Power and Light, presented a talk on how he had developed a demonstration program which had resulted in a high degree of success. It is impossible to depend on a similar installation already in operation, since a visitor in a restaurant kitchen can only be in the way, in addition to the fact that the prospect should be shown how electric cooking solves his own *specific* problems, not just *general* problems. In the most noteworthy of these successes, careful preparation was the key to the final sale. He was able to show, in the power company's demonstration room, just how rapidly steaks and baked potatoes could be served, thus helping turnover and producing higher profits. In his program, the customer is left to do his own thinking and to arrive at his own conclusions, but only after careful selling has pointed the way to only one satisfactory conclusion.

Getting Along with Architects

The mere fact that an architect or an engineer uses electricity in one application is no reason to believe he will use it in all similar installations, according to Ralph P. Fiebach, Sr., Kansas Gas & Electric Co. The fact that the architect is a creative man, and thrives on variety, often precludes his doing the same thing on similar problems. So the effective way to sell him on greater uses of electricity is to work through the mechanical or electrical engineer; the architect probably won't do much with an electrical recommendation until the engineer okays it anyway. Then the utility salesman should work closely with representatives from manufacturers to keep data up to date, make sure catalog sheets of discontinued models are destroyed. Lastly, the utility salesman should try to show examples of successful installations of a given device based upon environments which are similar to the local environment.

Lighting and Space Conditioning

The need for integrated lighting, heating and cooling systems was outlined by John E. Flynn, Large Lamp Dept., General Electric Co. He pointed out that lighting should be at a level compatible with the tasks involved, that there is a need for heat replacement during cold weather, and for removal of heat generated by lighting during summer weather, and that maximum efficiency from the lighting system will occur when near optimum ambient temperature conditions for the lamp and ballast are maintained. The solution to these problems lies in integrating the heating, cooling, and lighting plans into one system.

THE CONNECTING LINK

PURCHASER SALES MANUFACTURER REPRESENTATIVE

The SALES REPRESENTATIVE serves as a connecting link between the PURCHASER and the MANUFACTURER. The qualified rep is well informed concerning the customer's requirements and thoroughly familiar with the manufacturer's products. The rep's function of properly fitting together needs and products benefits all concerned.

The PURCHASER gains product application, quotation and expediting service. Also just and forthright handling of adjustments.

The MANUFACTURER gains a capable and efficient marketing organization at a predetermined low sales cost. The numerous contacts of each rep's sales personnel are especially valuable.

ELECTRICAL EQUIPMENT REPRESENTATIVES ASSOCIATION, founded in 1948, is dedicated to BETTER SELLING and SERVICE. Its members are ambitious to improve their performances and to benefit by the interchange of experiences and ideas with others in the same line of work.

Send for EERA Directory, listing the members, accounts handled and territories covered. It's free.

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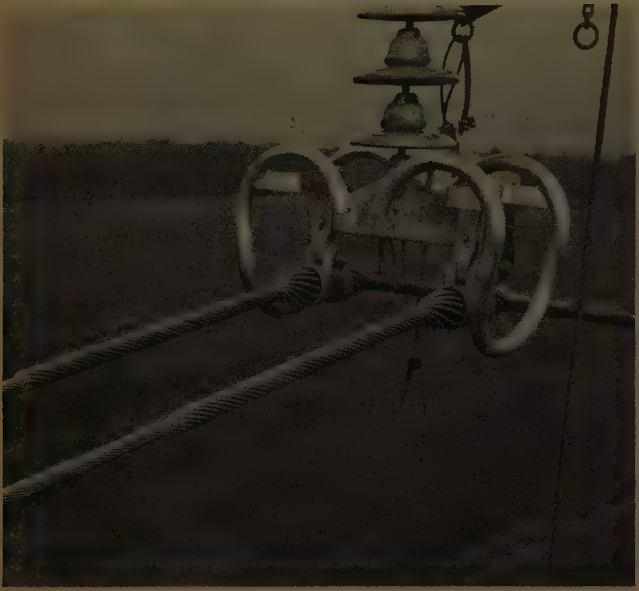

Completed suspension assembly is free of additional corona shielding devices at the ends of the AGS since the parrot bill feature of the rod ends is sufficient to restrict corona within the design requirements of 345-kv.

Preformed Line Products Develops New "Parrot-Bill" Armor Rod Ends

Preformed Armor-Grip Suspension assemblies with newly-designed rod ends shaped like a modified parrot-bill are being used on the Power Authority of the State of New York's 345-kv Niagara-Adirondak Tie Line.

The "Parrot-Bill" rod-end configuration is a feature aimed at raising the corona-onset level without the addition of separate corona shielding devices at the rod-end locations.

Tests of the new rod ends revealed significant improvement in performance characteristics over unshielded ball ends.

Penstock Coating Like New After 3½ Years

Coal tar coatings on the steel-plate surfaces of eight penstocks at the huge Bersimis River Plant of the Quebec Hydro-Electric Commission are as good now as when they were applied, according to the report of a recent inspection. Examinations for engineers from the Hydro Commission and Koppers Co., manufacturer, supplier, and contractor for the coating application, showed only pinpoint imperfections in a few scattered areas which required only minor touch-up. This involved less than 1/12 of 1 percent of the total 77,000 sq ft of coated metal and resulted not from wear and tear but rather from an extremely high rate of moisture condensation during application.

Requirements on the job called for a minimum life of five years for the coating. On the basis of previous experience, the enamel, although subject to constant high water pressure through the penstocks amounting to a maximum head of 540 psi, will last well over 40 years.

Crane Control Exhibit To Tour Western U. S.

Fifteen states, including 50 cities, will be visited by General Electric's rolling exhibit of modern crane control equipment. Featured exhibits include a new improved a-c reactor crane control panel, an improved d-c magnet brake, and new stepless induction and "joy stick" master switches. The exhibit is completely self-sustained and will go on location in utility and factory sites convenient to operating and maintenance personnel. The exhibit is currently in California, and will tour Washington and Oregon in May, Colorado Montana and Utah in June, and Nebraska, Kansas Missouri, and Iowa in July.

Big Sandy Plant Gets A-C Transformers

Two 150-mva transformers scheduled to be installed at the Big Sandy Plant of Kentucky Power Co. will be furnished by Allis-Chalmers. Originally scheduled to be one 300-mva unit, special design so that the coolers from one transformer can be added to the other makes possible an increase in emergency capability of up to 200 mva with one unit out of service.

Allis-Chalmers will also furnish all the miscellaneous pumps, excluding boiler feed and condenser auxiliaries, and all the auxiliary switchgear at the new station.

This Westinghouse 5000-watt thermoelectric plant is an experimental unit built for the U. S. Navy for an evaluation study of thermoelectric materials and fabrication techniques. The generator is composed of several thousand thermoelectric couples and is believed to be the largest thermoelectric generator ever built.

REE PROGRAM

Continued from page 56)

ereby going through the top of very tree. Now where is the sense n ruining a tree and then paying to uin it every year under the guise f maintenance? I insisted that the vires cross the strip in a zig zag ashion, connecting to each pole, but taying a distance from the trees. his was done and during the past 3 years the company hasn't spent cent for clearance along this strip.

Here is another example of lanned planting: Illuminaires were nstalled on one side of a park thorughfare in Cleveland. The lighted ide of the street had a narrow treeawn while the opposite side was vide. The light standards were 150 eet apart so we planted Wheatley lms (Ulmus carpinifolia sarnensis) 5 feet on each side of a standard, omplementing the installation and eaving an interesting 100 foot gap etween every two trees. On the pposite side of the road we planted lobehead elms (U. c umbraculifera) t 55 foot intervals. The pyramidal orm of the Wheatley precludes any ossibility of light interference on he pavement. The globe form across he road fits the space. This is an deal functional street planting comining a high degree of beauty in orm, low maintenance and correlaion of lighting and trees.

A little give and take on both ides can accomplish wonders. A ommon sense approach to the present utility and tree conflict will result in better looking trees and roadsides as well as reduced operation osts to utilities. This cannot be accomplished in one, five or ten years, out consider this: Where is the present aimless program headed? Only o more of the same. It will require vision and effort by both utilities and public tree officials, as well as courage, to do an about face and to egin planning.

The Illuminating Company has lazed a trail that is worth inspecion. While its MSTP program is good clean public relations that serves everyone, its contribution is eyond computation and will inrease in value each year for decades to come. The correct tree is good business for both the municiality and public utility.

AMCHEM, the makers of Weedone, can solve your brush problem...*whatever it is*

LINE CLEARANCE

Turn brush-choked utility rights-of-way into brush-free areas quickly and economically with WEEDONE/WEEDAR brush control chemicals. Also now available—complete brush control programs through new "dormant cane broadcast spraying" techniques.

ROADSIDE CLEARANCE

New AMIZINE Weed Killers and AMIZOL combinations provide complete vegetation control along thousands of miles of roadsides, center strips, embankments, guard rails, etc.

RIGHT-OF-WAY CLEARANCE

Specialized Amchem techniques using WEEDONE/WEEDAR chemicals and AMIZINE/AMIZOL combinations provide high control, low cost chemical brush eradication programs for railroads.

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PENGO HEAVY-DUTY Twin Helix Augers—14" through 96" hole diam.

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PENGO BORING HEADS for welding to your present auger flights.

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IF IT'S AUGERS YOU WANT, WE HAVE 'EM—JUST ASK US!

PENGO Augers and Boring Heads are available for all popular types of diggers, from light-duty post hole and farm tractor machines to the largest heavy-duty earth drills. Write today for free catalog; please address Dept. 28.

13-B

PETERSEN ENGINEERING CO., INC.
Santa Clara, California

Negative-Ion Generator Adds "Zest" To Office Air

The Ionalator® by **Schramyer Co.**, filters, negatively ionizes and circulates air at 250 cfm—enough to "ion-condition" an average private office in ten minutes. Recent controlled research has discovered that when negatively-ionized air is breathed, respiratory difficulties such as hay fever and asthma are markedly relieved. Researchers have also noted that negative ions have imparted to people a distinct feeling of well-being. The rapid advances in applying "ion conditioning" extend from the Navy's new submarines to space capsules, both where peak mental and physical conditions are mandatory. The Ionalator is enclosed in a fiberglass reinforced case and is operated from 115 v a-c. It measures 14¼ in. long by 8⅞ in. high by 6½ in. deep and weighs six lbs. It draws 90 watts.

Circle item #1 on reply card

High-Voltage Test Sets

A line of compact high-voltage test sets by **General Electric Co.** has increased the number of ratings in a-c sets and made a standard line of d-c sets available. The a-c line consists of 15 ratings in two classifications: 2 kva at 20, 35, and 50 kv; and 5, 10 and 25 kva at 50, 75, 100 and 150 kv. D-c test sets are available at 5 and 10 ma at ratings ranging from 30 to 150 kv.

Circle item #2 on reply card

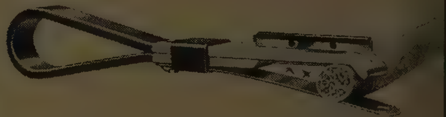
"Air-Filled" Pad Mounted Gear

Pad mounted gear by **S&C Electric Co.**, switches, protects, and isolates residential underground distribution circuits from 2.4 to 14.4 kv. It consists of fuses and disconnects designed for compact, air-filled enclosures. Basic applications are for transformers and for sectionalizing. Sectionalizing applications are handled by complete, free-standing units supplied by S&C.

Circle item #3 on reply card

Cable Tool Makes "Ring Cut"

Cable Tool No. N-2060 by **P. K. Neuses, Inc.**, is for ring-cutting the sheathing of "inside type" plastic fabric or rubber covered cable. Cable is pushed into tool and against spring. Back pressure holds cable against cutting blade. A 0.03125-in.-deep cut is made when tool is rotated around cable circumference. It is most practically suited for customary inside-type $\frac{3}{16}$ in. to ½ in. cables.



Circle item #4 on reply card

ight Weight Transformers

Light weight transformers in 500, 33 and 250 kva ratings, by **Kuhlman Electric Co.** allow a big boost n kva that can be pole mounted. The 3100 lb 500 is 50 in. high. Its osses are cut 32 percent, and the dual ratings—500 and 560—allow operation at 12 percent higher kva without service life sacrifice. The 333's weight is cut 50 percent and ts height shrunk to 46½ in. Loss reduction is 29 percent.

Circle item #5 on reply card

Million KVA Breaker

A 1-million kva, 15-kv magnetic air circuit breaker, type DST-1000, by **Federal Pacific Electric Co.**, incorporates highly efficient U-H design magnetic arc chutes which maintain a more uniform flux pattern in the interrupting chamber. This type of arc chute construction, combines "U" and "H" type in-

New CHAPMAN POL-KAP

stops pole top decay...seals out moisture permanently

This new pole maintenance aid from Chapman Chemical Company is a pad of Chapman Pol-Nu preservative grease, which contains 10% pentachlorophenol, with the addition of a special mastic compound. When applied to a pole top the Pol-Kap adheres permanently, forming a uniform protective cover to seal out moisture. The penta solution is released into the wood to kill existing decay and prevent its recurrence.

Unique packaging—The Pol-Kap is prepared in a sealed, ready-to-use package made of a water-soluble (but oil insoluble) film which is dissolved by rainfall, leaving only the continuous smooth layer of permanent preservative grease on the pole roof.

Easily, safely applied with special Pol-Kap Applicator

This special applicator mounts on the end of a hot stick and enables a lineman to apply the Pol-Kap without having to climb above hot wires. It takes only a few seconds to position the preservative pad which forms a permanent protective covering that won't crack or check and can't be blown off pole top.

CHAPMAN CHEMICAL COMPANY
Leading manufacturer of wood preservatives
Memphis 1, Tennessee

CHAPMAN®
Pol-Kap

MAIL FOR COMPLETE INFORMATION
Chapman Chemical Company
P. O. Box 138, Memphis 1, Tenn.
Please send literature on the Pol-Kap to:

Name__________
Company__________
Address__________

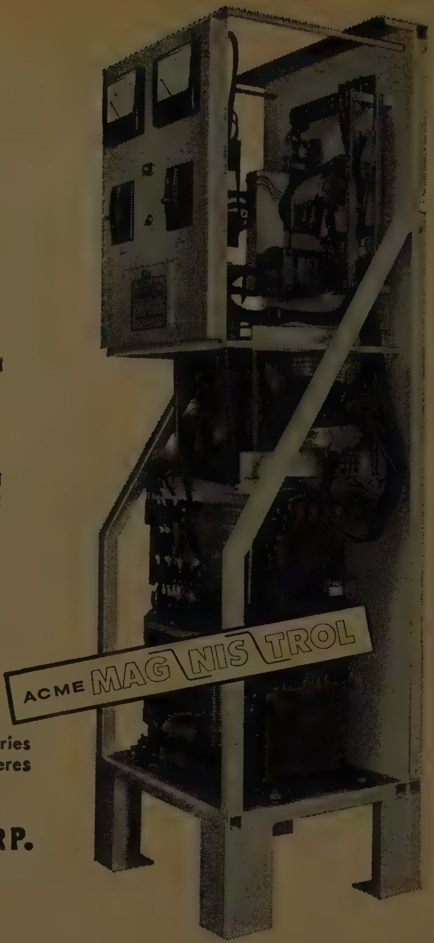
A NEW LINE OF FULLY AUTOMATIC SILICON

BATTERY CHARGERS

- NEWEST CIRCUITRY OF PROVEN DESIGN
- COMPLETELY STATIC MAGNETIC AMPLIFIER CIRCUITRY
- ±1% VOLTAGE REGULATION WITH ±10% LINE VARIATION
- REMOVABLE CABINET SHELL
- COMPLETE ACCESSIBILITY TO ALL CONTROLS
- STANDARD UNITS NORMALLY IN STOCK

Standard Units
1, 3, 6, 12 and 25 amperes;
24, 48 and 129 volts
Ask for Bulletin BC-323. Inquiries invited on units up to 300 amperes

Custom Equipment Division
ACME ELECTRIC CORP.
CUBA, NEW YORK
PLANTS IN CUBA, N. Y.
ALLEGANY, N. Y.



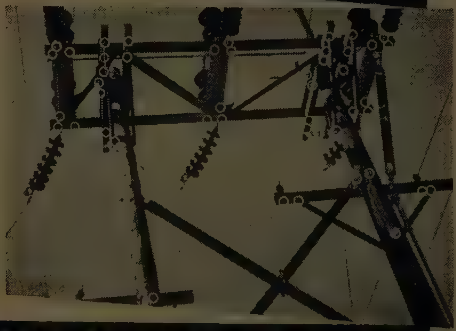
"Give me lock washers that will stay put!"

Specify **EATON-RELIANCE**
DOUBLE COIL Pole line Washers

The Eaton-Reliance Thackeray Spring Washer was engineered specifically for pole-line usage where there is vibration and stress. Because of their greater reactive range, these DOUBLE COIL HELICAL SPRING WASHERS are specified daily by power line and communications engineers throughout the nation, and are paying off in reduced line maintenance costs because of longer washer life. Remember—the failure of a single spring washer could result in the failure of an entire transmission line. These rugged spring washers provide an extra margin of protection against failure. Write for specifications.

Reliance Division
EATON
MANUFACTURING COMPANY
508 Charles Ave., S.E. • Massillon, Ohio

Sales Offices in Principal Cities from Coast to Coast



ternal magnetic design. Total interrupting times are less than 5 cycles from light load to full 42,000 amp interrupting capacity.

Circle item #6 on reply card

Seals Buried Connections

"Splicap" by **Western Plastics Co.**, provides a moisture tight, fool proof seal for underground direct-burial cable connections that can be made in well under half the time required using ordinary methods. It consists of five plastic sections. Threaded to fit into each other, two are used on each end of the splice and these two in turn are connected by the other threaded section. Neoprene O ring seals moisture.

Circle item #7 on reply card

TOP LEVEL CONSULTANT ON ELECTRIC UTILITY OPERATION

A challenging executive opportunity with a large management consulting firm. College graduate, with broad experience in electric utility operations, including administration, engineering, operations and knowledge of the electric utility business. Salary open—experience and capacity controlling. Send complete resume, including education, experience, references and salary expected to: Box 415, ELECTRIC LIGHT & POWER, 6 No. Michigan Ave., Chicago 2, Ill.

Large
Chemical Plant
Offers
Challenging Position

POWER
SUPERINTENDENT

Experience in all phases of power and power production necessary. Must be fully capable of assuming top supervisory rank. College degree in Mechanical, Chemical, or Electrical Engineering preferred.

Send complete resume to:
Personnel Dept.
NATIONAL ANILINE DIV.
ALLIED CHEMICAL CORP.
1051 So. Park Ave.,
Buffalo 10, N. Y.

MEN OF POWER

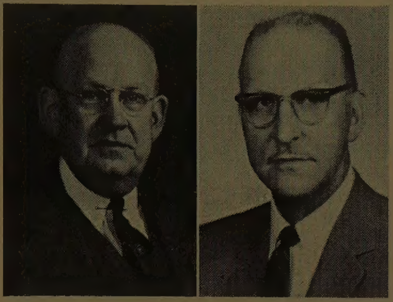
W. J. Rose

W. J. Rose, vice president and secretary of American Electric Power Company, has been elected a member of the company's board of directors. He joined the company in 1938 following service with Stone & Webster Service Corporation and became secretary in 1949 and vice president in 1952. He served a previous term as AEP director from 1954 to 1958, and is also presently vice president, secretary and director of the AEP system's six operating subsidiaries and of the AEP Service Corporation.

* * *

Arthur W. Flynn, formerly manager of development and project engineering with Nuclear Development Corporation of America, has joined Ebasco Services Incorporated as a nuclear engineer. In this post, he will be engaged in the application of nuclear science and engineering in connection with nuclear power plants, test reactors, nuclear research laboratories and other facilities.

* * *



Harry Hanson, left, treasurer of the New England Electric System, has been appointed financial vice president. He is a 43-year veteran of the company and has been its chief financial officer since 1935. **Robert F. Krause**, right, who has held executive positions in several of the System's subsidiary companies, has been named executive vice president. He joined the parent company in 1948 and is a member of the Bar.

* * *

Ralph J. Cordiner, General Electric Company chairman, announced with regrets last month the untimely retirement of **Robert Paxton**, company president, precipitated by the need for a continuing convalescence following major surgery in January. At the request of the Board of Directors Mr. Cordiner will act in the dual capacity of chairman and president until a new president is elected by the Board. In making the announcement, Mr. Cordiner emphasized the outstanding contributions of Mr. Paxton to the success and growth of the company.

* * *

John D. Hicks, assistant general counsel for Duke Power Company, has been named secretary for the company. He succeeds **P. B. Heartt** who has resigned as secretary but will continue as a director and as chairman of the company's finance committee.

INTRODUCING THE NEW

DRYDEN-EAST

HOTEL

39th St., East of Lexington Ave.

NEW YORK

Salon-size rooms • Terraces • New appointments, newly decorated • New 21" color TV • FM radio • New controlled air conditioning • New extension phones in bathroom • New private cocktail bar • Choice East Side, midtown area • A new concept of service. Prompt, pleasant, unobtrusive.

Single $15 to $22 Suites to $60
Special rates by the month or lease

Robert Sarason, General Manager
ORegon 9-3900
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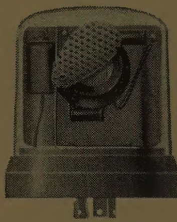
The Facts of Life in Street Light Control

1. Big killer of photo controls is transient voltage surges in secondaries which are below the spark-over of lightning arresters.

2. LUMATROL MARK I uses Varistors in conjunction with a secondary lightning arrester to withstand ALL transients up through the capabilities of the secondary arrester.

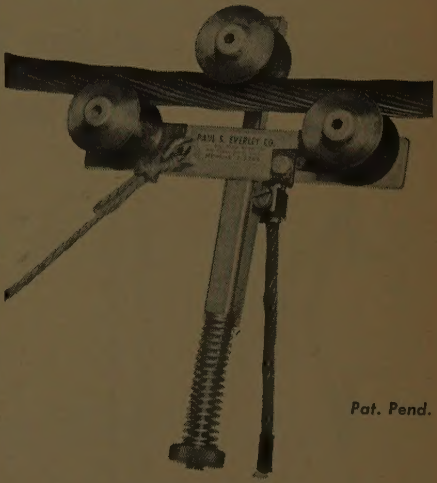
AUTOMATIC... COMPACT...



LIGHTWEIGHT...
SIMPLE...
...AND
COMPLETELY
RELIABLE!

WRITE FOR BULLETIN 91a.

MICRO BALANCING, INC.
GARDEN CITY PARK, N.Y.
In Canada: J. R. KEARNEY CORP.
Box 270, Guelph, Ont.



Pat. Pend.

EVER-GROUND

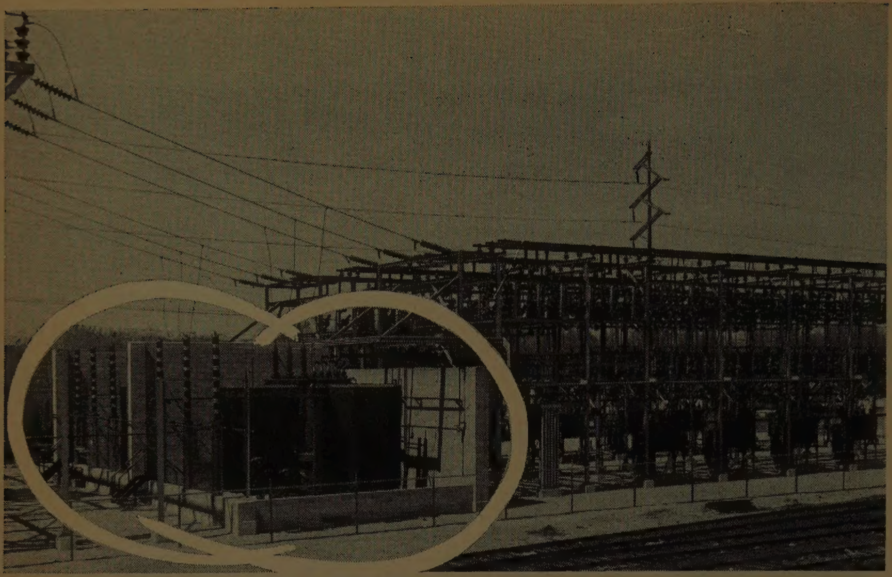
Provides constant grounding of moving conductors as they are pulled on a stringing job. The EVER-GROUND gives protection to linemen against accidental energizing of conductors, which could result in fatal injuries or severe burns.

EVER-GROUND snaps on the line at any point without a threading-through operation. High-contact rollers have Oilite Bearings—no oiling necessary. The large coil spring keeps the rollers in firm contact pressure with the moving conductor at all times, and permits the passage of splices.

Secure EVER-GROUND to cross-arm or reel with rope line. It will "float" on the moving conductor, keeping it constantly grounded.

Catalog #JT3, shown above, will take conductors from 1/16" to 1½" diameter. Models available for all size conductors.

PAUL S. EVERLEY CO.
550 Ninth Street, San Francisco 3, Calif. • HEmlock 1-2295



OVER 1,000,000 KVA IN SERVICE

A DELTA GROUNDED TRANSFORMER
SAVES SPACE AND MONEY
when both the high voltage and low voltage require a neutral ground

Correspondence invited if you desire additional descriptive matter, have any questions or desire recommendations for a specific problem.

H. L. HOEPPNER
Park Ridge, Ill.
211 Imperial St.

New Sealed Aluminum Hoist Line means easy lifting in any weather!

Efficient hoist performance is assured by sealing out moisture, oils, chemicals and dirt from the brake mechanism. Five seals provide permanent protection under exposure conditions.

Lifting is easy with the Coffing Sealed Disk Brake Lever Hoist because the handle pull to lift rated load requires only 57 pounds with the ¾-ton model to 93 pounds with the 6-ton model. Load spotting is precise—to within minute fractions of an inch. Sealed brake will not slip. Six models—¾ to 6-tons.

The high strength aluminum alloy frame is light—makes for easy portability. Ask your distributor or write for Bulletin ADH-78.

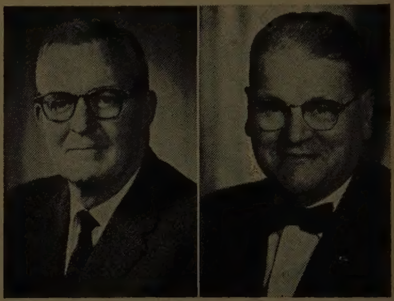
COFFING HOISTS
DUFF-NORTON COMPANY
Four Gateway Center • Pittsburgh 22, Pa.

Hugh G. Isley and **Shearon Harris** have been elected to the board of directors of Carolina Power & Light Company. Mr. Isley is vice president and general sales manager, and Mr. Harris is vice president and associate general counsel.

* * *

Fred J. Funari, division personnel manager at Washington for West Penn Power Company, has been appointed director of personnel and will be located at company headquarters in Greensburg. Prior to his Washington assignment he served in the general office as public relations assistant.

* * *



Fred L. Fletcher, left, executive vice president of Sierra Pacific Power Co., has been named president of the company. He succeeds **Frank A. Tracy**, right, who becomes chairman of the board of directors. Mr. Fletcher joined the company in 1960 following several years in various executive posts with Central Illinois Electric and Gas Company. Mr. Tracy had been general manager prior to his election to the presidency in 1942.

* * *

Albert V. Lowe, formerly vice president of Grant Advertising, Inc., has been appointed manager of the EEI's Live Better Electrically program succeeding **Ralph Zeuthen** who resigned Feb. 1 to join Compton Advertising, Inc. He will administer the $2½-million advertising and promotional program.

* * *

George E. Watkins, who has served in a number of capacities on the EEI headquarters staff, has been named director of the Institute's new Research Division.

* * *

James E. Myers has been appointed general manager of Control Instrument Co., a Burroughs subsidiary.

MEN OF POWER BRIEFS

J. E. Dews, manager of Arkansas Power & Light Company's Eastern Division, has been appointed manager of divisions. **John D. Jacobs** succeeds to his former post.

Frederick H. Mueller, secretary of commerce in the Eisenhower cabinet, has been elected to the board of directors of The Detroit Edison Company.

E. E. Fournace, assistant to the vice president and general manager of Ohio Power Company, and **Robert W. Osterholm,** OPC commercial manager, have been elected directors of the American Electric Power Service Corporation.

J. S. Wilde has been named director of tax services in the Management Consulting Division of Ebasco Services Incorporated.

Recent General Electric Company appointments include: **Eugene M. Hunter,** to manager of power transmission engineering, Electric Utility Systems Engineering; **H. Richard Lloyd** to manager of Automation and Systems Control Sales, Electric Utility Sales; **Robert C. Spencer, Jr.,** to supervisor of turbine steam design engineering; **C. T. Kastner** to manager of manufacturing, Power Transformer Dept.; and **R. C. Berendsen** to general manager of the new Industrial Process Control Computer Section.

James H. Hilton, former director of engineering with Southern Indiana Gas and Electric Company, is now director of marketing at Royal Electric Manufacturing Company.

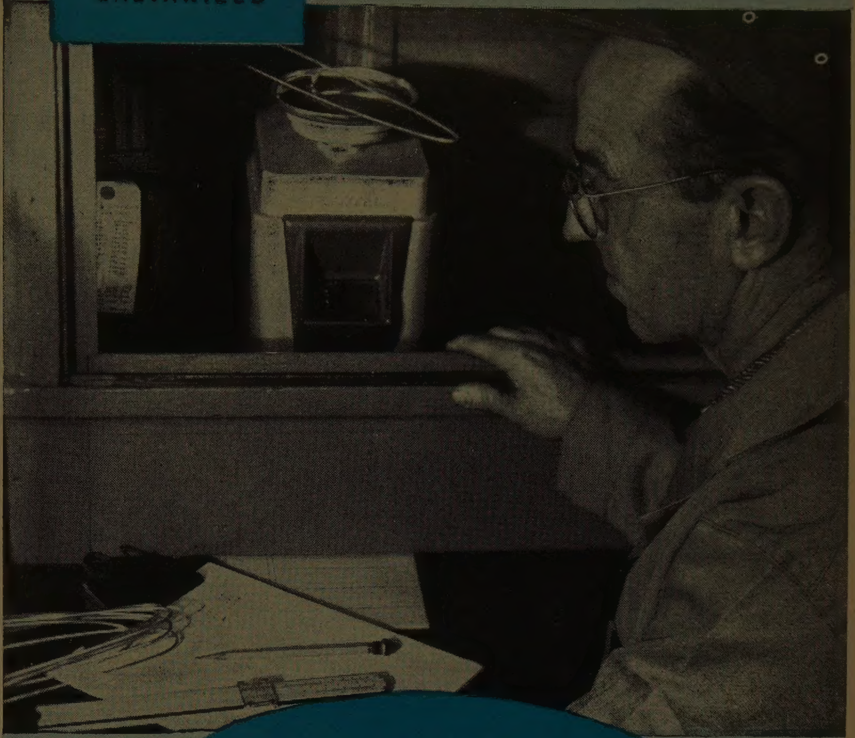
Roy E. Uptegraff, Sr., board chairman of the manufacturing and transformer companies bearing his name, passed away last month. His son, **Roy Jr.,** continues as president of both companies.

Lambert J. Gross has been named vice president-finance and **Mitchell Kiamie** controller for Combustion Engineering, Inc.

Alfred H. Macillivray is the new works manager of Rockbestos Wire & Cable Co., Div. of Cerro Corp.

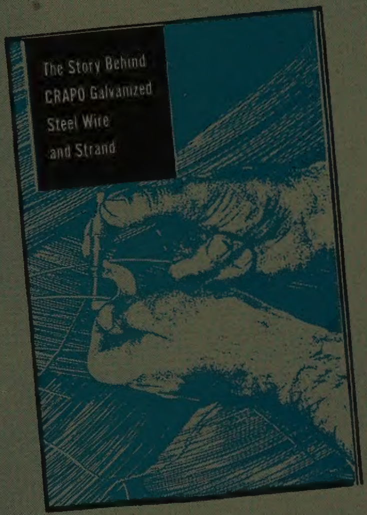
New general sales manager of The Union Metal Manufacturing Co. is **K. C. Dorland.** He succeeds **L. F. Heckman** who passed away early this year.

Crapo GALVANIZED STEEL STRAND



WEIGHT OF COATING TEST

...added assurance of dependability



The life of galvanized steel strand depends primarily upon the weight and quality of the zinc coating. The heavier the coating the longer the strand will last.

The wire used in CRAPO Galvanized Steel Strand is regularly subjected to the hydrochloric acid antimony chloride, or weight of coating, test. By means of this test the amount of zinc on the surface of the wire can be accurately measured.

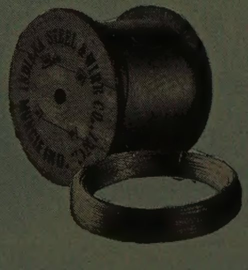
This is but one of the many laboratory tests to assure consistently high, dependable quality in the finished product.

AVAILABLE IN 3 COATING WEIGHTS

CRAPO Steel Strand is regularly furnished in all standard sizes and grades and in Class A, B and C coatings. Class B coating is twice as heavy as Class A coating; Class C coating is three times as heavy.

Write for this FREE BOOKLET!

"The Story Behind CRAPO Galvanized Wire and Strand" describes and illustrates manufacturing and testing techniques. Ask for Booklet B-59!



INDIANA STEEL & WIRE CO., INC.
Muncie, Indiana

CALENDAR OF EVENTS

April 16-18—Rocky Mountain Electrical League, Spring Conference, Harvest House, Boulder, Colo.

April 17-19—A & M College of Texas, Fourteenth Annual Conference for Protective Relay Engineers, College Station, Tex.

April 17-18—Pacific Coast Electrical Association, Business Development Section, Sheraton-Palace Hotel, San Francisco, Calif.

April 20-21—Edison Electric Institute, Industrial Relations Committee, Joint meeting with Personnel Administration Section, Southeastern Electric Exchange and the Southwestern Personnel Group, Roosevelt Hotel, New Orleans, La.

April 23-25—ASME Metals Engineering Conference, Penn-Sheraton Hotel, Pittsburgh, Pa.

April 23-May 6—National Management Association, Third Annual Advanced Management Institute, Granville Inn, Granville, Ohio.

April 23-29—Planning Seminar (Unit I).

April 26-27—Pennsylvania Electric Association, T&D Committee Meeting, Irem Temple Country Club, Dallas, Pa.

April 26-27—Indiana Utility Association, Twenty-first Annual Young Men's Utility Conference, Severin Hotel, Indianapolis, Ind.

April 27-28—Pennsylvania Electric Association, Communications Committee Meeting, Hotel Alexander, Hagerstown, Md.

April 27—Missouri Basin Inter-Agency Committee Meeting, VFW Building, Casper, Wyo.

April 27-28—Pacific Coast Electrical Association, Administrative Services Section, Villa Hotel, San Francisco, Calif.

April 30-May 6—Direct-Motivating Seminar (Unit II).

April 29-May 3—53rd Annual Convention of the National Association of Electrical Distributors, Cobo Hall, Detroit, Mich.

May 1—Interstate Power Club, Beverly Hotel, New York, N. Y.

May 2-4—American Society of Training Directors, Inc., 17th Annual Conference, Bellevue-Stratford Hotel, Philadelphia, Pa.

May 8-10—Instrument Society of America, 4th National ISA Power Instrumentation Symposium, LaSalle Hotel, Chicago, Ill.

May 16-18 and May 23-25—Line Material Industries, Distribution Systems Seminars, Thomas A. Edison Laboratories, Franksville, Wisc.

May 17-19—Pacific Coast Electric Association, Annual Convention, Sheraton-Palace Hotel, San Francisco, Calif.

May 18-19—Pennsylvania Electric Association, System Operating Committee, Sky Top Lodge Hotel, Skytop, Pa.

May 22-24—American Institute of Electrical Engineers, American Rocket Society, Institute of Radio Engineers, Institute of Aerospace Sciences, and Instrument Society of America, National Telemetering Conference, Sheraton Towers Hotel, Chicago, Ill.

May 26—Pennsylvania Electric Association, Relay Committee Meeting, Sky Top Lodge Hotel, Skytop, Pa.

June 11-13—Wisconsin Utilities Association, Accounting Section Conference, Dell View Hotel, Lake Delton, Wis.

June 13-14—National Safety Council, Public Utilities Section, Executive Committee, Laurentien Hotel, Montreal, Quebec, Can.

June 28-30—American Institute of Electrical Engineers, Instrument Society of America, American Institute of Chemical Engineers, American Society of Mechanical Engineers, Institute of Radio Engineers, Second Joint Automatic Control Conference, University of Colorado, Boulder, Colo.

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